

X. What are the Costs and Economic Impacts of the Proposed Revisions

A. Introduction and Overview

This section presents EPA's estimates of the costs and economic impacts that would occur as a result of today's proposed regulations. Costs and economic impacts are evaluated for each commodity sector, including the beef, veal, heifer, dairy, swine, broiler, turkey and egg laying sectors. A description of each of the ELG technology options and the NPDES scenarios considered by EPA, and the rationale for selecting the proposed BAT Option and NPDES Scenario, are provided in Sections VII and VIII of this document. Detailed information on estimated compliance costs are provided in the *Development Document for the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations* (referred to as the "Development Document"). EPA's detailed economic assessment can be found in *Economic Analysis of the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations* (referred to as "Economic Analysis"). EPA also prepared the *Environmental and Economic Benefit Analysis of the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations* ("Benefits Analysis") in support of today's proposal. These documents are available at EPA's website at <http://www.epa.gov/owm/afo.htm>.

This section presents EPA's estimate of the total annual incremental costs and the economic impacts that would be incurred by the livestock and poultry industry as a result of today's proposed rule. This section also discusses EPA's estimated effects to small entities and presents the results of EPA's cost-effectiveness and cost-benefit analysis. All costs presented in this document are reported in 1999 pre-tax dollars (unless otherwise indicated).

B. Data Collection Activities

1. Sources of Data to Estimate Compliance Costs

As part of the expedited approach to this rulemaking, EPA has chosen not to conduct an industry-wide survey of all CAFOs using a Clean Water Act Section 308 questionnaire. Rather, EPA is relying on existing data sources and expertise provided by the U.S. Department of Agriculture (USDA), industry, State agriculture extension agencies, and several land grant universities. More detailed information on the data used for this analysis can be found in the *Development Document* and also the *Economic Analysis*.

EPA collected and evaluated data from a variety of sources. These sources include information compiled through EPA site visits to over 100 animal confinement operations and information from industry trade associations, government agencies, and other published literature. EPA also received information from environmental groups such as the Natural Resources Defense Council and the Clean Water Network. The Agency contacted university experts, state cooperatives and extension services, and state and EPA regional representatives to identify facilities for site visits. EPA also attended USDA-sponsored farm tours and site visits arranged by other groups, as well as industry, academic, and government conferences.

EPA obtained data and information from several agencies in USDA, including the National Agricultural Statistics Service (NASS), Natural Resources Conservation Service (NRCS), the Animal and Plant Health Inspection Service (APHIS), and the Economic Research Service (ERS). The collected data include statistical survey information and published reports.

EPA gathered information from a wide range of published NASS reports, including annual data summaries for each commodity group. USDA's NASS is responsible for objectively providing important, usable, and accurate statistical information and data support services on the structure and activities of agricultural production in the United States. Each year NASS conducts surveys and prepares reports covering virtually every facet of U.S. agricultural production. The primary sources of data are animal production facilities in the United States. NASS collects voluntary information using mail surveys, telephone and in-person interviews, and field observations. NASS is also responsible for conducting a Census of Agriculture.

EPA's main source of primary USDA data containing farm level descriptive information is USDA's Census of Agriculture (Census). USDA's Census is a complete accounting of United States agricultural production and is the only source of uniform, comprehensive agricultural data for every county in the nation. The Census is conducted every 5 years by NASS. The Census includes all farm operations from which \$1,000 or more of agricultural products are produced and sold. The most recent Census reflects calendar year 1997 conditions. This database is maintained by USDA. Data used for this analysis were compiled with the assistance of staff at USDA's NASS. (USDA periodically publishes aggregated data from these databases and also compiles customized analyses of the data to members of the public and other government agencies. In providing such analyses, USDA maintains a sufficient level of aggregation to ensure the confidentiality of any individual operation's activities or holdings.)

USDA's NRCS publishes the Agricultural Waste Management Field Handbook, which is an agricultural engineering guidance manual that explains general waste management principles and provides detailed design information for particular waste management systems. USDA's Handbook reports specific design information on a variety of farm production and waste management practices at different types of feedlots. The Handbook also reports runoff calculations under normal and peak precipitation as well as information on manure and bedding characteristics. EPA used this information to develop its cost and environmental analyses. NRCS personnel also contributed technical expertise in

the development of EPA's estimates of compliance costs and environmental assessment framework by providing EPA with estimates of manure generation in excess of expected crop uptake. This information is provided in the record that supports this rulemaking.

NRCS also compiled and performed analyses on Census data that EPA used for its analyses. These data identify the number of feedlots, their geographical distributions, and the amount of cropland available to land apply animal manure generated from their confined feeding operations (based on nitrogen and phosphorus availability relative to crop need).

EPA gathered information from several reports on the livestock and poultry industries from the National Animal Health Monitoring System (NAHMS). USDA's APHIS provides leadership in ensuring the health and care of animals and plants, improving agricultural productivity and competitiveness, and contributing to the national economy and public health. One of its main responsibilities is to enhance the care of animals. In 1983, APHIS initiated the NAHMS as an information-gathering program to collect, analyze, and disseminate data on animal health, management, and productivity. NAHMS conducts national studies to gather data and generate descriptive statistics and information from data collected by other industry sources.

USDA's ERS provides economic analyses on efficiency, efficacy, and equity issues related to agriculture, food, the environment, and rural development to improve public and private decision-making. EPA's analysis of economic impacts at a model CAFO references a wide range of published ERS reports and available farm level statistical models. ERS also maintains farm level profiles of cost and returns compiled from NASS financial data.

Databases and reports containing the information and data used by EPA in support of this proposed rule are available in the rulemaking record.

2. Sources of Data to Estimate Economic Impacts

To estimate economic impacts, EPA used farm level data from USDA, industry, and land grant universities. The major source of primary USDA data on farm financial conditions is from the Agricultural Resources Management Study (ARMS). ARMS is USDA's primary vehicle for data collection on a broad range of issues about agricultural production practices and costs. These data provide a national perspective on the annual changes in the financial conditions of production agriculture.

USDA's ARMS data provide aggregate farm financial data, which EPA used for its cost impact analysis. The ARMS data provide complete income statement and balance sheet information for U.S. farms in each of the major commodity sectors, including those affected by the proposed regulations. The ARMS financial data span all types of farming operations within each sector, including full-time and part-time producers, independent owner operations and contract grower operations, and confinement and non-confinement production facilities.

ERS provided aggregated data for select representative farms through special tabulations of the ARMS data that differentiate the financial conditions among operations by commodity sector, facility size (based on number of animals on-site) and by major producing region for each sector. The 1997 ARMS data also provide corresponding farm level summary information that matches the reported average financial data to both the total number of farms and the total number of animals for each aggregated data category. As with the Census data, ERS aggregated the data provided to EPA to preserve both the statistical representativeness and confidentiality of the ARMS survey data. ARMS data used for this analysis are presented in the *Economic Analysis* and are available in the rulemaking record.

EPA obtained additional market data on the U.S. livestock and poultry industries as a whole from a wide variety of USDA publications and special reports. These include: *Financial Performance of U.S. Commercial Farms, 1991-1994*; *USDA Baseline Projections 2000, Food Consumption, Prices and Expenditures, 1970-1997*; *Agricultural Prices Annual Summary*; annual NASS statistical bulletins for these sectors; and data and information reported in *Agricultural Outlook* and ERS's *Livestock, Dairy, and Poultry Situation and Outlook* reports. Other source material is from ERS's cost of production series reports for some sectors and trade reports compiled by USDA's Foreign Agricultural Service (FAS). Information on the food processing segments of these industries is from the U.S. Department of Commerce's Census of Manufacturers data series. Industry information is also from USDA's Grain Inspection Packers and Stockyards Administration (GIPSA).

Industry and the associated trade groups also provided information for EPA's cost and market analyses. In particular, the National Cattlemen's Beef Association (NCBA) conducted a survey of its membership to obtain financial statistics specific to cattle feeding operations. EPA used these and other data to evaluate how well the ARMS data for beef operations represent conditions at cattle feedyards. EPA also obtained industry data from the National Milk Producers Federation (NMPF) and the National Pork Producers Council (NPPC).

EPA also used published research by various land grant universities and their affiliated research organizations, as well as information provided by environmental groups.

Databases and reports containing the information and data provided to and used by EPA in support of this proposed rule are available in the rulemaking record.

C. Method for Estimating Compliance Costs

1. Baseline Compliance

For the purpose of this analysis, EPA assumes that all CAFOs that would be subject to the proposed regulations are currently in compliance with the existing regulatory program (including the NPDES regulations and the effluent limitations guidelines and standards for feedlots) and existing state laws and regulations. As a practical matter, EPA recognizes that this is not true, since only 2,500

operations out of an estimated 12,700 CAFOs with more than 1,000 AU have actually obtained coverage under an NPDES permit and the remainder may in fact experience additional costs to comply with the existing requirements. EPA has not estimated these additional costs in the analysis that is presented in today's preamble because the Agency did not consider these costs part of the incremental costs of complying with today's proposed rule.

To assess the incremental costs attributable to the proposed rules, EPA evaluated current federal and state requirements for animal feeding operations and calculated compliance costs of the proposed requirements that exceed the current requirements. Operations located in states that currently have requirements that meet or exceed the proposed regulatory changes would already be in compliance with the proposed regulations and would not incur any additional cost. These operations are not included as part of the cost analysis. A review of current state waste management requirements for determining baseline conditions is included in the *Development Document* and also in other sections of the record (See *State Compendium: Programs and Regulatory Activities Related to Animal Feeding Operations* compiled by EPA and available at <http://www.epa.gov/owm/afo.htm#Compendium>).

EPA also accounted for current structures and practices that are assumed to be already in place at operations that may contribute to compliance with the proposed regulations. Additional information is also provided in the following section (X.C.2(a)). This information is also provided in the *Development Document*.

2. Method for Estimating Incremental CAFO Compliance Costs

a. Compliance Costs to CAFO Operators

For the purpose of estimating total costs and economic impacts, EPA calculated the costs of compliance for CAFOs to implement each of the regulatory options being considered (described in Section VIII of this preamble). EPA estimated costs associated with four broad cost components: nutrient management planning, facility upgrades, land application, and technologies for balancing on-farm nutrients. Nutrient management planning costs include manure and soil testing, record keeping, monitoring of surface water and groundwater, and plan development. Facility upgrades reflect costs for manure storage, mortality handling, storm water and field runoff controls, reduction of fresh water use, and additional farm management practices. Land application costs address agricultural application of nutrients and reflect differences among operations based on cropland availability for manure application. Specific information on the capital costs, annual operating and maintenance costs, start-up or first year costs, and also recurring costs assumed by EPA to estimate costs and impacts of the proposed regulations is provided in the *Development Document*.

EPA evaluated compliance costs using a representative facility approach based on more than 170 farm level models that were developed to depict conditions and to evaluate compliance costs for select representative CAFOs. The major factors used to differentiate individual model CAFOs include

the commodity sector, the farm production region, and the facility size (based on herd or flock size or the number of animals on-site). EPA's model CAFOs primarily reflect the major animal sector groups, including beef cattle, dairy, hog, broiler, turkey, and egg laying operations. Practices at other subsector operations are also reflected in the cost models, such as replacement heifer operations, veal operations, flushed caged layers, and hog grow- and farrow-finish facilities. EPA used model facilities with similar waste management and production practices to depict operations in regions that were not separately modeled.

Another key distinguishing factor incorporated into EPA's model CAFOs includes information on the availability of crop and pasture land for land application of manure nutrients. For this analysis, nitrogen and phosphorus rates of land application are evaluated for three categories of cropland availability: Category 1 CAFOs are assumed to have sufficient cropland for all on-farm nutrients generated, Category 2 CAFOs are assumed to have insufficient cropland, and Category 3 CAFOs are assumed to have no cropland. EPA used 1997 information from USDA to determine the number of CAFOs within each category. This information takes into account which nutrient (nitrogen or phosphorus) is used as the basis to assess land application and nutrient management costs.

For Category 2 and Category 3 CAFOs, EPA evaluated additional technologies that may be necessary to balance nutrients. EPA evaluated additional technologies that reduce off-site hauling costs associated with excess on-farm nutrients, as well as to address ammonia volatilization, pathogens, trace metals, and antibiotic residuals. These technologies may include Best Management Practices (BMPs) and various farm production technologies, such as feed management strategies, solid-liquid separation, composting, anaerobic digestion, and other retrofits to existing technologies. EPA considered all these technologies for identification of "best available technologies" under the various options for BAT described in Section VIII.

EPA used soil sample information compiled by researchers at various land grant universities to determine areas of phosphorus and nitrogen saturation, as described in the *Development Document*. This information provides the basis for EPA's assumptions of which facilities would need to apply manure nutrients on a phosphorus- or nitrogen-based standard.

EPA's cost models also take into account other production factors, including climate and farmland geography, land application and waste management practices and other major production practices typically found in the key producing regions of the country. Model facilities reflect major production practices used by larger confined animal farms, generally those with more than 300 AU. Therefore, the models do not reflect pasture and grazing type farms, nor do they reflect typical costs to small farms. EPA's cost models also take into account practices required under existing state regulations and reflect cost differences within sectors depending on manure composition, bedding use, and process water volumes. More information on the development of EPA's cost models is provided in the *Development Document*.

To estimate aggregate incremental costs to the CAFO industry from implementing a particular technology option, EPA first estimated the total cost to a model facility to employ a given technology, including the full range of necessary capital, annual, start-up, and recurring costs. Additional detailed information on the baseline and compliance costs attributed to model CAFOs across all sectors and across all the technology options considered by EPA is provided in the *Development Document*.

After estimating the total cost to an individual facility to employ a given technology, EPA then weighted the average facility level cost to account for current use of the technology or management practice nationwide. This is done by multiplying the total cost of a particular technology or practice by the percent of operations that are believed to use this particular technology or practice in order to derive the average expected cost that could be incurred by a model CAFO. EPA refers to this adjustment factor as the "frequency factor" and has developed such a factor for each individual cost (i.e. each technology) and cost component (i.e. capital and annual costs) in each of its CAFO models. The frequency factor reflects the percentage of facilities that are, technically, already in compliance with a given regulatory option since they already employ technologies or practices that are protective of the environment. The frequency factor also accounts for compliance with existing federal and state regulatory requirements as well as the extent to which an animal sector has already adopted or established management practices to control discharges.

EPA developed its frequency factors based on data and information from USDA's NRCS and NAHMS, state agricultural extension agencies, industry trade groups and industry-sponsored surveys, academic literature, and EPA's farm site visits. More detailed information on how EPA developed and applied these weighting factors is provided in the *Development Document*. To identify where farm level costs may be masked by this weighting approach, EPA evaluated costs with and without frequency factors. The results of this sensitivity analysis indicate that the model CAFO costs used to estimate aggregate costs and impacts, as presented in this preamble, are stable across a range of possible frequency factor assumptions.

The data and information used to develop EPA's model CAFOs were compiled with the assistance of USDA, in combination with other information collected by EPA from extensive literature searches, more than 100 farm site visits, and numerous consultations with industry, universities, and agricultural extension agencies. Additional detailed information on the data and assumptions used to develop EPA's model CAFOs that were used to estimate aggregate incremental costs to the CAFO industry is provided in the *Development Document*.

b. Compliance Costs to Recipients of CAFO Manure

To calculate the cost to offsite recipients of CAFO manure under the proposed regulations, EPA builds upon the cropland availability information in the CAFO models, focusing on the two categories of farms that have excess manure nutrients and that need to haul manure offsite for alternative use or to be spread as fertilizer (i.e., Category 2 and Category 3 CAFOs, where facilities are assumed to have

insufficient or no available cropland to land apply nutrients, respectively). EPA also uses this information to determine the number of offsite recipients affected under select regulatory alternatives, shown in Tables 10-3 and 10-4.

USDA defines farm level “excess” of manure nutrients on a confined livestock farm as manure nutrient production less crop assimilative capacity. USDA has estimated manure nutrient production using the number of animals by species, standard manure production per animal unit, and nutrient composition of each type of manure. Recoverable manure is the amount that can be collected and disposed by spreading on fields or transporting off the producing farm.

Depending on the nutrient used to determine the rate of manure application (nitrogen or phosphorus), EPA estimates that approximately 7,500 to 10,000 CAFOs with more than 300 AU are expected to generate excess manure. This includes about 2,600 animal feeding operations that have no major crop or pasture land. These estimates were derived from a USDA analysis of manure nutrients relative to the capacity of cropland and pastureland to assimilate nutrients. EPA’s estimate does not account for excess manure that is already disposed of via alternative uses such as pelletizing or incineration.

For the purpose of this analysis, EPA assumes that affected offsite facilities are field crop producers who use CAFO manure as a fertilizer substitute. Information on crop producers that currently receive animal manure for use as a fertilizer substitute is not available. Instead, EPA approximates the number of operations that receive CAFO manure and may be subject to the proposed regulations based on the number of acres that would be required to land apply manure nutrients generated by Category 2 and Category 3 CAFOs. EPA assumes that offsite recipients will only accept manure when soil conditions allow for application on a nitrogen basis. Therefore, the manure application rate at offsite acres in a given region is the nitrogen-based application rate for the typical crop rotation and yields obtained in that region. EPA then estimates the number of farms that receive CAFO manure by dividing the acres needed to assimilate excess manure nitrogen by the national average farm size of 487 acres, based on USDA data. The results of this analysis indicate that 18,000 to 21,000 offsite recipients would receive excess CAFO manure.

The costs assessed to manure recipients include the costs of soil testing and incremental recordkeeping. EPA evaluated these costs using the approach described in Section X.C.2(a). Excess manure hauling costs are already included in costs assessed to CAFOs with excess manure. For the purpose of this analysis, EPA has assumed that crop farmers already maintain records documenting crop yields, crop rotations, and fertilizer application, and that crop farmers already have some form of nutrient management plan for determining crop nutrient requirements. EPA estimates, on average, per-farm incremental costs of approximately \$540 to non-CAFOs for complying with the offsite certification requirements. This analysis is provided in the *Development Document*.

3. Cost Annualization Methodology

As part of EPA's costing analysis, EPA converts the capital costs that are estimated to be incurred by a CAFO to comply with the proposed requirements, described in Section X.C.2, to incremental annualized costs. Annualized costs better describe the actual compliance costs that a model CAFO would incur, allowing for the effects of interest, depreciation, and taxes. EPA uses these annualized costs to estimate the total annual compliance costs and to assess the economic impacts of the proposed requirements to regulated CAFOs that are presented in Sections X.E and X.F.

Additional information on the approach used to annualize the incremental compliance costs developed by EPA is provided in Appendix A of the *Economic Analysis*. EPA uses a 10-year recovery period of depreciable property based on the Internal Revenue Code's guidance for single purpose agricultural or horticultural structures. The Internal Revenue Service defines a single purpose agricultural structure as any enclosure or structure specifically designed, constructed and used for housing, raising, and feeding a particular kind of livestock, including structures to contain produce or equipment necessary for housing, raising, and feeding of livestock. The method EPA uses to depreciate capital investments is the Modified Accelerated Cost Recovery System (MACRS).

EPA assumes a real private discount/interest rate of 7 percent, as recommended by the Office of Management and Budget. EPA also assumes standard federal and average state tax rates across the broad facility size categories to determine an operation's tax benefit or tax shield, which is assumed as an allowance to offset taxable income.

D. Method for Estimating Economic Impacts

To estimate economic impacts under the proposed regulations, EPA examined the impacts across three industry segments: regulated CAFOs, processors, and national markets.

1. CAFO Analysis

EPA estimates the economic impacts of today's proposed regulations using a representative farm approach. A representative farm approach is consistent with past research that USDA and many land grant universities have conducted to assess a wide range of policy issues, including environmental legislation pertaining to animal agriculture. A representative farm approach provides a means to assess average impacts across numerous facilities by grouping facilities into broader categories to account for the multitude of differences among animal confinement operations. Information on how EPA developed its model CAFOs is available in the *Economic Analysis*. Additional information on EPA's cost models is provided in the *Development Document*. At various stages in the proposed rulemaking, EPA presented its proposed methodological approach to USDA personnel and to researchers at various land grant universities for informal review and feedback.

Using a representative farm approach, EPA constructed a series of model facilities that reflect the EPA's estimated compliance costs and available financial data. EPA uses these model CAFOs to develop an average characterization for a group of operations. EPA's cost models were described

earlier in Section X.C.2(a). From these models, EPA estimates total annualized compliance costs by aggregating the average facility costs across all operations that are identified for a representative group. EPA's cost models are compared to corresponding model CAFOs that characterize financial conditions across differently sized, differently managed, and geographically distinct operations. As with EPA's cost models, EPA's financial models are grouped according to certain distinguishing characteristics for each sector, such as facility size and production region, that may be shared across a broad range of facilities. Economic impacts under a post-regulatory scenario are approximated by extrapolating the average impacts for a given model CAFO across the larger number of operations that share similar production characteristics and are identified by that CAFO model.

EPA compares its estimated compliance costs at select model CAFOs to corresponding financial conditions at these model facilities. For this analysis, EPA focuses on three financial measures that are used to assess the affordability of the proposed CAFO regulations. These include total gross revenue, net cash income, and debt-to-asset ratio. Financial data used by EPA to develop its financial models are from the 1997 ARMS data summaries prepared by ERS and form the basis for the financial characterization of the model CAFOs. To account for changes in an operation's income under post-compliance conditions, EPA estimated the present value of projected facility earnings, measured as a future cash flow stream. The present value of cash flow represents the value in terms of today's dollars of a series of future receipts. EPA calculated baseline cash flow as the present value of a 10-year stream of an operation's cash flow. EPA projected future earnings from the 1997 baseline using USDA's *Agricultural Baseline Projections* data. Section 4 of the *Economic Analysis* provides additional information on the baseline financial conditions attributed to EPA's model CAFO across all sectors as well as information on the data and assumptions used to develop these models.

EPA evaluates the economic achievability of the proposed requirements based on changes in representative financial conditions for select criteria, as described in Section X.F.1. For some sectors, EPA evaluates economic impacts at model CAFOs under varying scenarios of cost passthrough between the CAFO and the latter stages in the food marketing chain, such as the processing and retail sectors. These three scenarios include: zero cost passthrough, full (100 percent) cost passthrough, and partial cost passthrough (greater than zero). Partial cost passthrough values used for this analysis vary by sector and are based on estimates of price elasticity of supply and demand reported in the academic literature. This information is available in the docket.

Table 10-1 lists the range of annualized compliance costs developed for EPA's analysis. Annualized costs for each sector are summarized across the estimated range of minimum and maximum costs across all facility sizes and production regions and are broken out by land use category (described in Section X.C.2). In some cases, "maximum" costs reflect average costs for a representative facility that has a large number of animals on-site; EPA's cost models for very large CAFOs are intended to approximate the average unit costs at the very largest animal feeding operations. More detailed annualized costs broken out by production region, land use category, and broad facility size groupings are provided in the *Economic Analysis*.

Estimated annualized costs shown in Table 10-1 are presented in 1999 dollars (post-tax). All costs presented in today’s preamble have been converted using the Construction Cost Index to 1999 dollars from the 1997 dollar estimates that are presented throughout the *Development Document* and the *Economic Analysis*. As shown in the table, costs for Category 3 CAFOs may be lower than those for Category 1 CAFOs since facilities without any land do not incur any additional incremental costs related to hauling. EPA has assumed that these operations are already hauling off-site in order to comply with existing requirements. More detailed cost estimates for individual technologies are provided in the *Development Document*.

To assess the impact of the regulations on offsite recipients of CAFO manure, EPA compares the estimated cost of this requirement to both aggregate and average per farm production costs and revenues (a sales test). This analysis uses EPA’s estimated compliance costs and 1997 aggregate farm revenues and production costs reported by USDA. For the purpose of this analysis, EPA assumes that these costs will be incurred by non-CAFO farming operations (i.e., crop producers) that use animal manures as a fertilizer substitute and will not be borne by CAFOs.

Table 10-1: Range of Annualized Model CAFO Compliance Costs (\$1999, post-tax)

Sector	Category 1 ^{1/}		Category 2 ^{1/}		Category 3 ^{1/}	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
(1999 dollars per model CAFO across all size groups)						
Beef	\$2,100	\$986,000	\$8,500	\$1,219,800	\$1,000	\$896,700
Veal	\$1,500	\$8,100	\$1,100	\$6,100	\$1,000	\$6,000
Heifers	\$1,700	\$16,900	\$2,000	\$17,900	\$1,200	\$11,700
Dairy	\$5,200	\$44,600	\$14,700	\$67,700	\$4,200	\$40,300
Hogs: GF ^{2/}	\$300	\$52,300	\$5,500	\$63,500	\$11,400	\$81,500
Hogs: FF ^{2/}	\$300	\$82,900	\$8,800	\$100,600	\$10,000	\$115,500
Broilers	\$4,800	\$36,300	\$4,400	\$25,800	\$3,900	\$21,400
Layers: wet ^{3/}	\$300	\$24,800	\$2,100	\$29,300	\$1,500	\$18,100
Layers: dry ^{3/}	\$1,500	\$59,000	\$1,400	\$31,700	\$1,200	\$27,600
Turkeys	\$4,900	\$111,900	\$4,800	\$29,500	\$3,800	\$20,800

Source: EPA.

^{1/} Category 1 CAFOs have sufficient cropland for all on-farm nutrients generated; Category 2 CAFOs have insufficient cropland; and Category 3 CAFOs have no cropland.

^{2/} “Hogs: FF” are farrow-finish (includes breeder and nursery pigs); “Hogs: GF” are grower-finish only.

^{3/} “Layers: wet” are operations with liquid manure systems; “Layers: dry” are operations with dry systems.

2. Processor Analysis

As discussed in Section VI, EPA estimates that 94 meat packing plants that slaughter hogs and 270 poultry processing facilities may be subject to the proposed co-permitting requirements (Section VI). Given the structure of the beef and dairy sectors and the nature of their contract relationships, EPA expects that no meat packing or processing facilities in these sectors will be subject to the proposed co-permitting requirements. EPA bases these assumptions on data from the Department of Commerce on the number of slaughtering and meat packing facilities in these sectors and information from USDA on the degree of animal ownership at U.S. farms, as described in Section VI of this document. Additional information is provided in Section 2 of the *Economic Analysis*. EPA is seeking comment on this assumption as part of today's notice.

EPA did not conduct a detailed estimate of the costs and impacts that would accrue to individual co-permittees. Information on contractual relationships between contract growers and processing firms is proprietary and EPA does not have the necessary market information and data to conduct such an analysis. Market information is not available on the number and location of firms that contract out the raising of animals to CAFOs or on the number and location of contract growers, and the share of production, that raise animals under a production contract. In addition, EPA does not have data on the exact terms of the contractual agreements between processors and CAFOs to assess when a processor would be subject to the proposed co-permitting requirements, and EPA does not have financial data for processing firms or contract growers that utilize production contracts.

EPA, however, believes that the framework used to estimate costs to CAFOs does provide a means to evaluate the possible upper bound of costs that could accrue to processing facilities in those industries where production contracts are more widely utilized and where EPA believes the proposed co-permitting requirements may affect processors. EPA's CAFO level analysis examines the potential share of (pre-tax) costs that may be passed on from the CAFO, based on market information for each sector. Assuming that a share of the costs that accrue to the CAFO are eventually borne by processors, EPA is proposing that this amount approximates the magnitude of the costs that may be incurred by processing firms in those industries that may be affected by the proposed co-permitting requirements. EPA solicits comment on this approach.

To assess the impact of the regulations on processors, EPA compares the passed through compliance costs to both aggregate processor costs of production and to revenues (a sales test). These analyses use estimated compliance costs, cost passthrough estimates, and aggregate revenues and production costs by processing sector. National processor cost and revenue data are from the U.S. Department of Commerce's Census of Manufacturers data series. For some sectors, EPA evaluates the impact of the proposed regulations on processors under two scenarios of cost passthrough from the animal production sectors (described in Section X.D.1), including full cost and partial cost passthrough. More detail on this approach is provided in Section 4 of the *Economic Analysis*.

This suggested approach does not assume any addition to the total costs of the rule as a result of co-permitting. This approach also does not assume that there will be a cost savings to contract

growers as result of a contractual arrangement with a processing firm. This approach merely attempts to quantify the potential magnitude of costs that could accrue to processors that may be affected by the co-permitting requirements. Due to lack of information and data, EPA has not analyzed the effect of relative market power between the contract grower and the integrator on the distribution of costs, nor the potential for additional costs to be imposed by the integrator's need to take steps to protect itself against liability and perhaps to indemnify itself against such liability through its production contracts. EPA has also not specifically analyzed the environmental effects of co-permitting. EPA has conducted an extensive review of the agricultural literature on market power in each of the livestock and poultry sectors and concluded that there is little evidence to suggest that increased production costs would be prevented from being passed on through the market levels. This information is provided in the rulemaking record. However, as discussed in Section VII.C.5, EPA recognizes that some industry representatives do not support these assumptions of cost passthrough from contract producers to integrators and requests comments on its cost passthrough assumptions, both in general and as they relate to the analysis of processor level impacts under the proposed co-permitting requirements.

EPA's processor analysis does not explicitly account for the few large corporate operations that are vertically integrated, to the extent that the corporation owns and operates all aspects of the operation, from animal production to final consumer product. These operations are covered by EPA's CAFO analysis to the extent that they are captured by USDA's farm survey and are included among EPA's model CAFOs. While the ARMS data may include information on CAFOs that are owned by corporate operations, these data cannot be broken out to create a model specifically designed to represent these operations. Since EPA's analysis uses farm financial data and not corporate data, this analysis does not reflect the ability of corporations to absorb compliance costs that may be incurred at CAFOs that are owned by that entity. EPA expects that its analysis overestimates the impact to corporate entities since revenues of corporate entities are, in most cases, no less than and are likely to exceed those at a privately-owned and operated CAFOs.

3. Market Analysis

EPA's market analysis evaluates the effects of the proposed regulations on national markets. This analysis uses a linear partial equilibrium model adapted from the COSTBEN model developed by USDA's Economic Research Service. The modified EPA model provides a means to conduct a long-run static analysis to measure the market effects of the proposed regulations in terms of predicted changes in farm and retail prices and product quantities. Market data used as inputs to this model are from a wide range of USDA data and land grant university research. EPA consulted researchers from USDA and the land grant universities in the development of this modeling framework. The details of this model are described in Appendix B of the *Economic Analysis*.

Once price and quantity changes are predicted by the model, EPA uses national multipliers that relate changes in sales to changes in total direct and indirect employment and also to national economic output. These estimated relationships are based on the Regional Input-Output Modeling System

(RIMS II) from the U.S. Department of Commerce. This approach is described in Section 4 of the *Economic Analysis*.

E. Estimated Annual Costs of the Proposed Regulatory Options/Scenarios

As discussed in Section VII and VIII, EPA considered various technology options and also different scope scenarios as part of the development of today’s proposed regulations. A summary overview of the ELG options and NPDES scenarios is provided in Table 10-2. More detail is available in Sections VII and VIII of today’s preamble.

Table 10-2. Summary Description of Options/Scenarios Considered by EPA

Technology Options (ELG)	
Option 1:	N-based land application controls and inspection and recordkeeping requirements for the production area (described in Section VIII.C.3)
Option 2	Same as Option 1, but restricts the rate of manure application to a P-based rate where necessary (depending on specific soil conditions at the CAFO)
Option 3 BAT (Beef/Heifers/Dairy)	Adds to Option 2 by requiring all operations to determine whether the groundwater beneath the production area has a direct hydrologic connection to surface water; if so, requires groundwater monitoring and controls
Option 4	Adds to Option 3 by requiring sampling of surface waters adjacent to production area and/or land under control of the CAFO to which manure is applied
Option 5 BAT (Swine/Poultry/Veal)	Adds to Option 2 by establishing a zero discharge requirement from the production area that does not allow for an overflow under any circumstances
Option 6	Adds to Option 2 by requiring that large hog and dairy operations install and implement anaerobic digestion and gas combustion to treat their manure
Option 7	Adds to Option 2 by prohibiting manure application to frozen, snow covered or saturated ground
Regulatory Scope Options (NPDES)	
Scenario 1	Retains existing 3-tier framework and establishes additional requirements (described in Section VII.C.2)
Scenario 2	Same as Scenario 1; operations with 300-1,000 AU would be subject to the regulations based on certain “risk-based” conditions (described in VII.C.3.b)
Scenario 3 “Three-Tier”	Same as Scenario 2, but allows operations with 300-1,000 AU to either apply for a NPDES permit or to certify to the permit authority that they do not meet any of the conditions and thus are not required to obtain a permit

Scenario 4a “Two-Tier” (500 AU)	Establishes 2-tier framework and applies ELG standard to all operations with more than 500 AU
Scenario 4b	Establishes 2-tier framework and applies ELG standard to all operations with more than 300 AU
Scenario 5 “Two-Tier” (750 AU)	Establishes 2-tier framework and applies ELG standard to all operations with more than 750 AU
Scenario 6	Retains existing 3-tier framework and establishes a simplified certification process (described in Section VII.C.2)

The “BAT Option” refers to EPA’s proposal to require nitrogen-based and, where necessary, phosphorus-based land application controls of all livestock and poultry CAFOs (Option 2), with the additional requirement that all cattle and dairy operations must conduct groundwater monitoring and implement controls, if the groundwater beneath the production area has a direct hydrologic connection to surface water (Option 3 BAT), and with the additional requirement that all hog, veal, and poultry CAFOs must also achieve zero discharge from the animal production area with no exception for storm events (Option 5 BAT). For reasons outlined in Section VIII, EPA is not proposing that beef and dairy CAFOs meet the additional requirements under Option 5 or that hog and poultry CAFOs meet the additional requirements under Option 3. Section VIII discusses EPA’s basis for the selection of these technology bases for the affected subcategories.

EPA is jointly proposing two NPDES Scenarios that differ in terms of the manner in which operations are defined as a CAFO. Scenario 4a is to the two-tier alternative that defines as CAFOs all animal feeding operations with more than 500 AU (alternatively, Scenario 5 is the two-tier alternative that defines all animal feeding operations with more than 750 AU as CAFOs). Scenario 3 is three-tier structure that defines as CAFOs all animal feeding operations with more than 1,000 AU and any operation with more than 300 AU, if they meet certain “risk-based” conditions, as defined in Section VII. Under Scenario 3, EPA would require all confinement operations with between 300 and 1,000 AU to either apply for a NPDES permit or to certify to the permit authority that they do not meet certain conditions and thus are not required to obtain a permit.

For the purpose of this discussion, the “*two-tier structure*” refers to the combination of BAT Option 3 (beef and dairy subcategories) and BAT Option 5 (swine and poultry subcategories), and NPDES Scenario 4a that covers all operations with more than 500 AU. Where indicated, the two-tier structure may refer to the alternative threshold at 750 AU. The “*three-tier structure*” refers to the combination of ELG Option 3 (beef and dairy subcategories) and Option 5 (swine and poultry subcategories), and NPDES Scenario 3 that covers operations down to 300 AU based on certain conditions. More detail of the technology options considered by EPA is provided in Section VIII.

Section VII of this preamble provides additional information on the alternative scope scenarios considered by EPA. EPA did not evaluate costs and economic impacts under the alternative three-tier structure that combines the BAT Option with Scenario 6, as described in Table 10-2.

Under the two-tier structure, EPA estimate that 25,540 CAFOs with more than 500 AU may be defined as CAFOs and subject to the proposed regulations. EPA estimates that 19,100 CAFOs may be defined as CAFOs under the alternative two-tier threshold of 750 AU. Under the three-tier structure, an estimated 31,930 CAFOs would be defined as CAFOs (Table 6-2) and an additional 7,400 operations in the 300 to 1,000 AU size range would need to certify that they do not need to apply for a permit. This total estimate counts operations with more than a single animal type only once. EPA's analysis computes total compliance costs based on the total number of CAFOs in each sector, including mixed operations that have more than 300 or 500 AU of at least one animal type. This approach avoids understating costs at operations with more than one animal type that may incur costs to comply with the proposed requirements for each type of animal that is raised on-site that meets the size threshold for a CAFO or is designated as a CAFO by the permitting authority. Therefore, EPA's compliance costs estimates likely represent the upper bound since costs at facilities with more than a single animal type may, in some cases, be lower due to shared production technologies and practices across all animal types that are produced on-site.

1. Costs to CAFOs under the Proposed Regulations

Tables 10-3 and 10-4 summarize the total annualized compliance costs to CAFOs attributed to the proposed two-tier structure and three-tier structure. The table shows these costs broken out by sector and by broad facility size group. EPA calculated all estimated costs using the data, methodology and assumptions described in Sections X.B and X.C.

Under the two-tier structure, EPA estimates that the incremental annualized compliance cost to CAFO operators would be approximately \$831 million annually (Table 10-3). Table 10-5 shows estimated costs for the two-tier structure at the 750 AU threshold, estimated by EPA to total \$721 million annually. Most of this cost (roughly 70 percent) is incurred by CAFOs with more than 1,000 AU. Overall, about one-third of all estimated compliance costs are incurred within the hog sectors.

Under the three-tier structure, EPA estimates that the total cost to CAFO operators would be \$925 million annually (Table 10-4). These costs are expressed in terms of pre-tax 1999 dollars. (Post-tax costs of are estimated at \$573 million and \$635 million annually, respectively, and include tax savings to CAFOs. EPA uses estimated post-tax costs to evaluate impacts to regulated facilities, discussed in Section X.F) Estimated total annualized costs for the three-tier structure include the cost to permitted CAFOs as well as the estimated cost to operations to certify to the permit authority that they do not meet any of the conditions and are thus are not required to obtain a permit. EPA estimates certification costs at about \$80 million annually, which covers phosphorus-based PNP costs, facility upgrades, and letters of certification from manure recipient. More information on these costs and how they are calculated is provided in Section 5 of the *Economic Analysis*.

Estimated total annualized costs shown in Table 10-3 and 10-4 include costs to animal confinement operations that may be designated as CAFOs. Total annualized costs to designated facilities is estimated at less than one million dollars annually (Tables 10-3 and 10-4). As discussed in Section VI, EPA assumes that designation may bring an additional 50 operations each year under the two-tier structure; under the three-tier structure, EPA expects that an additional 10 operations may be designated each year. In this analysis, estimated costs to designated facilities are expressed on an average annual basis over a projected 10-year period. For the purpose of this analysis, EPA assumes that operations that may be designated as CAFOs and subject to the proposed regulations will consist of beef, dairy, farrow-finish hog, broiler and egg laying operations under the two-tier structure. Under the three-tier structure, EPA estimates that fewer operations would be designated as CAFOs, with 10 dairy and hog operations being designated each year, or 100 operations over a 10-year period. Additional information is provided in the *Economic Analysis*.

Table 10-3. Annual Pre-tax Cost of Two-Tier Structure (BAT Option/Scenario 4a), \$1999

Sector	#Operations	Total	>1000 AU	500 - 1000 AU	<500 AU ^{1/}
	(number) ^{2/}	(\$1999, millions, pre-tax)			
Regulated CAFOs					
Beef	3,080	\$216.4	\$191.5	\$24.7	\$0.1
Veal	90	\$0.3	\$0.03	\$0.3	NA
Heifer	800	\$11.6	\$3.7	\$7.9	NA
Dairy	3,760	\$177.6	\$108.6	\$65.4	\$3.6
Hog	8,550	\$294.0	\$225.5	\$67.0	\$1.5
Broiler	9,780	\$97.1	\$55.4	\$41.6	\$0.1
Layer	1,640	\$14.2	\$9.9	\$4.3	NA
Turkey	1,280	\$19.6	\$10.4	\$9.2	NA
Subtotal	25,540	\$830.7	\$605.0	\$220.2	\$5.4
Other Farming Operations					
Offsite Recipients	17,923	\$9.6	NA	NA	NA
TOTAL	NA	\$840.3	NA	NA	NA

Source: USEPA. See *Economic Analysis*. Table 6-2 provides information on affected operations.

Numbers may not add due to rounding. NA = Not Applicable. Option/Scenario definitions provided in Table 10-2.

^{1/} Cost estimates shown are for designated CAFOs (see Section VI).

^{2/} "Total" adjusts for operations with more than a single animal type. The number of CAFOs shown includes expected defined CAFOs only and excludes designated facilities.

Table 10-4. Annual Pre-tax Cost of Three-Tier Structure (BAT Option/Scenario 3), \$1999

Sector	#Operations	Total	>1000 AU	300 - 1000 AU	<300 AU ^{1/}
	(number) ^{2/}	(\$1999, millions, pre-tax)			
Regulated CAFOs					
Beef	3,210	\$227.7	\$191.5	\$36.2	\$0.0
Veal	140	\$0.8	\$0.03	\$0.8	\$0.0
Heifer	980	\$14.4	\$3.7	\$10.7	\$0.0
Dairy	6,480	\$224.6	\$108.6	\$115.3	\$0.7
Hog	8,350	\$306.1	\$225.5	\$80.4	\$0.2
Broiler	13,740	\$116.6	\$55.4	\$61.2	\$0.0
Layer	2,010	\$15.3	\$9.9	\$5.4	\$0.0
Turkey	2,060	\$24.9	\$10.4	\$14.5	\$0.0
Subtotal	31,930	\$930.4	\$605.0	\$324.5	\$0.8
Other Farming Operations					
Offsite Recipients	21,155	\$11.3	NA	NA	NA
Total	NA	\$936.7	NA	NA	NA

Source: USEPA. See *Economic Analysis*. Table 6-2 provides information on affected operations.

Numbers may not add due to rounding. NA = Not Applicable. Option/Scenario definitions provided in Table 10-2.

^{1/} Cost estimates shown are for designated CAFOs (see Section VI).

^{2/} "Total" adjusts for operations with more than a single animal type. The number of CAFOs shown includes expected defined CAFOs only and excludes designated facilities.

2. Costs to CAFOs of Alternative Regulatory Options and Scenarios

Alternative regulatory options considered by EPA during the development of today's proposed regulations include various technology options and also different regulatory scope scenarios. Sections VII and VIII present the Agency's rationale for each regulatory decision.

Table 10-5 summarizes the total annualized (pre-tax) costs of alternative technology options for each NPDES scenario and ELG technology basis considered by EPA. As shown in the table, the total estimated costs across these options range from \$355 million (Option 1/Scenario 1) to \$1.7 billion annually (Option 5, applicable to all the animal sectors, and Scenario 4b). By scenario, this reflects the fact that fewer CAFOs would be affected under Scenario 1 (a total of about 16,400 operations) as compared to Scenario 4b (about 39,300 operations affected). As noted in Section X.E, EPA's estimate of the number of CAFOs and corresponding compliance costs does not adjust for operations with mixed animal types and may be overstated. By technology option, with the exception of Options 1 and 4, costs are evaluated incremental to Option 2 (see Table 10-2). Compared to Option 2, Option 5

costs are greatest. Additional breakout of these costs by sector are provided in the *Economic Analysis*.

Table 10-5. Annualized Pre-tax Costs for the Alternative NPDES Scenarios (\$1999, million)

Option/ Scenario	Scenario 4a “Two-Tier”	Scenario 2/3 “Three- Tier”	Scenario 1	Scenario 5 >750 AU	Scenario 4b >300 AU
#CAFOs ^{1/}	25,540	28,860	16,420	25,770	39,320
Option 1	\$432.1	\$462.8	\$354.6	\$384.3	\$493.6
Option 2	\$548.8	\$582.8	\$444.4	\$484.0	\$633.3
Option 3	\$746.7	\$854.1	\$587.0	\$649.5	\$883.6
Option 4	\$903.9	\$1,088.2	\$707.0	\$768.0	\$1,121.2
Option 5	\$1,515.9	\$1,632.9	\$1,340.9	\$1,390.4	\$1,671.3
Option 6	\$621.6	\$736.9	\$501.5	\$541.3	\$706.6
Option 7	\$671.3	\$781.9	\$542.4	\$585.1	\$756.6
BAT Option	\$830.7	\$925.1	\$680.3	\$720.8	\$979.6

Source: USEPA. See *Economic Analysis*. Cost estimates shown include costs to designated operations. Numbers may not add due to rounding. NA = Not Applicable. Option/Scenario definitions provided in Table 10-2.
^{1/}“Total” adjusts for operations with more than a single animal type. The number of CAFOs shown includes expected defined CAFOs only and excludes designated facilities.

3. Costs to Offsite Recipients of CAFO Manure under the Proposed Regulations

As described in Section VII, EPA is proposing that offsite recipients of CAFO manure certify to the CAFO that manure will be land applied in accordance with proper agriculture practices. As shown in Table 10-3, EPA estimates that 18,000 non-CAFO farming operations will receive manure and therefore be required to certify proper manure utilization under the proposed two-tier structure. Under the alternative three-tier structure, up to 3,000 additional farming operations may be affected. EPA’s analysis assumes that affected CAFO manure recipients are mostly field crop producers who use CAFO manure as a fertilizer substitute. EPA’s analysis does not reflect manure hauled offsite for alternative uses such as incineration or pelletizing. EPA estimates the annualized cost of this requirement to offsite recipients to be \$9.6 to \$11.3 million across the co-proposed alternatives (Tables 10-3 and 10-4). This analysis is provided in the *Development Document*.

Estimated costs to recipients of CAFO manure include incremental recordkeeping and soil tests every 3 years. Conservation Technology Information Center (CTIC) Core 4 survey data suggest an

average of 46 percent crop farmers regularly sample their soil. EPA believes crop farmers already maintain records pertaining to crop yields, nutrient requirements, and fertilizer applications. EPA also assumed that crop farmers have a nutrient management plan, though the plan is not necessarily a PNP (Permit Nutrient Plan) or CNMP (Comprehensive Nutrient Management Plan). EPA has evaluated alternative approaches to ensuring that manure is handled properly, but is not proposing to establish specific requirements for offsite recipients. The costs to offsite recipients do not include the costs of spreading manure at the offsite location or any additional payments made to brokers or manure recipients in counties with excess manure. These costs are likely to be offset by the fertilizer savings and organic value associated with manure. EPA's analysis accounts for the costs incurred by the CAFO for offsite transfer of excess manure in the estimated industry compliance costs, described in Section X.E.1. These costs include the cost of soil and manure sampling at the CAFO site, training for manure applicators, application equipment calibration, and the hauling cost of excess manure generated by the CAFO.

Under the proposed regulations, CAFOs would be required to apply manure on a phosphorus basis where necessary, based on soil conditions, and on a nitrogen basis elsewhere. EPA anticipates that offsite recipients of CAFO manure will only accept manure when soil conditions allow for application on a nitrogen basis. EPA believes this is a reasonable assumption because crop farms are less likely to have a phosphorus buildup associated with long term application of manure. EPA's analysis assumes a nitrogen-based application rate for offsite locations that is identical to the rate used by CAFOs in the same geographic region. A summary of the data and methodology used by EPA to calculate the number of affected offsite recipients and to estimate costs is presented in Section X.C.2(b). EPA solicits comment on the costs and assumptions pertaining to offsite recipients.

F. Estimated Economic Impacts of the Proposed Regulatory Options/Scenarios

This section provides an overview of EPA's estimated economic impacts across four industry segments that are included for this analysis: CAFOs (both existing and new sources), non-CAFO recipients of manure, processors, and consumer markets. More detailed information on each of these analyses is available in the *Economic Analysis*.

1. CAFO Level Analysis

This section presents EPA's analysis of financial impacts to both existing and new CAFOs that will be affected by the proposed regulations, as well as impacts to offsite recipients of CAFO manure who will also be required to comply with the proposed PNP requirements.

a. Economic Impacts to Existing CAFOs under the Proposed Regulations

As discussed in Section X.C.1, EPA's CAFO level analysis examines compliance cost impacts for a representative "model CAFO." EPA evaluates the economic achievability of the proposed

regulatory options at existing animal feeding operations based on changes in representative financial conditions across three criteria. These criteria are: a comparison of incremental costs to total revenue (sales test), projected post-compliance cash flow over a 10-year period, and an assessment of an operation's debt-to-asset ratio under a post-compliance scenario. To evaluate economic impacts to CAFOs in some sectors, impacts are evaluated two ways—assuming that a portion of the costs may be passed on from the CAFO to the consumer and assuming that no costs passthrough so that all costs are absorbed by the CAFO.

EPA used the financial criteria to divide the impacts of the proposed regulations into three impact categories. The first category is the affordable category, which means that the regulations have little or no financial impact on CAFO operations. The second category is the moderate impact category, which means that the regulations will have some financial impact on operations at the affected CAFOs, but EPA does not consider these operations to be vulnerable to closure as a result of compliance. The third category is the financial stress category, which means that EPA considers these operations to be vulnerable to closure post-compliance. More information on these criteria is provided in Section 4 of the *Economic Analysis*.

The basis for EPA's economic achievability criteria for this rulemaking is as follows. USDA's financial classification of U.S. farms identifies an operation with negative income and a debt-asset ratio in excess of 40 percent as "vulnerable." An operation with positive income and a debt-asset ratio of less than 40 percent is considered "favorable." EPA adopted this classification scheme as part of its economic achievability criteria, using net cash flow to represent income. This threshold and cash flow criterion is established by USDA and other land grant universities, as further described in Section 4 of the *Economic Analysis*. The threshold values used for the cost-to-sales test (3 percent, 5 percent and 10 percent) are those determined by EPA to be appropriate for this rulemaking and are consistent with threshold levels used by EPA to measure impacts of regulations for other point source dischargers (as also documented in the *Economic Analysis*).

For this analysis, EPA's determination of economic achievability used all three criteria. EPA considered the proposed regulations to be economically achievable for a representative model CAFO if the average operation has a post-compliance sales test estimate within an acceptable range, positive post-compliance cash flow over a 10-year period, and a post-compliance debt-to-asset ratio not exceeding 40 percent. If the sales test shows that compliance costs are less than 3 percent of sales, or if post-compliance cash flow is positive and the post-compliance debt-to-asset ratio does not exceed 40 percent and compliance costs are less than 5 percent of sales, EPA considers the options to be "Affordable" for the representative CAFO group. A sales test of greater than 5 percent but less than 10 percent of sales with positive cash flow and a debt-to-asset ratio of less than 40 percent is considered indicative of some impact at the CAFO level, but at levels not as severe as those indicative of financial distress or vulnerability to closure. These impacts are labeled "Moderate" for the representative CAFO group. EPA considers both the "Affordable" and "Moderate" impact categories to be economically achievable by the CAFO.

If (with a sales test of greater than 3 percent) post-compliance cash flow is negative or the post-compliance debt-to-asset ratio exceeds 40 percent, or if the sales test shows costs equal to or exceeding 10 percent of sales, the proposed regulations are estimated to be associated with potential financial stress for the entire representative CAFO group. In such cases, each of the operations represented by that group may be vulnerable to closure. These impacts are labeled as “Stress.” EPA considers the “Stress” impact category to indicate that the proposed requirements may not be economically achievable by the CAFO, subject to other considerations.

Tables 10-6 and 10-7 present the estimated CAFO level impacts in terms of the number of operations that fall within the affordable, moderate, or stress impact categories for each of the co-proposed alternatives by sector and facility size group. For some sectors, impacts are shown for both the zero and the partial cost passthrough assumptions (discussed more fully below). Partial cost passthrough values vary by sector, as described in Section X.D.1.

EPA’s costs model analyzes impacts under two sets of conditions for ELG Option 3. Option 3A assumes that there is a hydrologic connection from groundwater to surface waters at the CAFO; Option 3 assumes average costs conditions across all operations—both operations with and without a hydrologic link. Based on available data and information, EPA’s analysis assumes 24 percent of the affected operations have a hydrologic connection to surface waters. More detail on this assumption may be found in the rulemaking record. EPA solicits comment on this assumption as part of today’s proposed rulemaking.

Based on results shown in Tables 10-6 and 10-7, EPA proposes that the regulatory alternatives are economically achievable for all representative model CAFOs in the veal, turkey and egg laying sectors. The proposed requirements under the two-tier structure are also expected to be economically achievable by all affected heifer operations. Furthermore, although operations across most sectors may experience moderate impacts, EPA does not expect moderate financial impacts to result in closure and considers this level of impact to be economically achievable.

In the beef cattle, heifer, dairy, hog and broiler sectors, however, EPA’s analysis indicates that the proposed regulations will cause some operations to experience financial stress, assuming no cost passthrough. These operations may be vulnerable to closure by complying with the proposed regulations. Across all sectors, an estimated 1,890 operations would experience financial stress under the two-tier structure and an estimated 2,410 operations would experience stress under the three-tier structure. For both tier structures, EPA estimates that the percentage of operations that would experience impacts under the stress category represent 7 percent of all affected CAFOs or 8 percent of all affected operations in the sectors where impacts are estimated to cause financial stress (cattle, dairy, hog, and broiler sectors).

Tables 10-6 shows results for the two-tier structure at the 500 AU threshold. By sector, EPA estimates that 1,420 hog operations (17 percent of affected hog CAFOs), 320 dairies (9 percent of operations), 150 broiler operations (2 percent), and 10 beef operations (less than 1 percent) would

experience financial stress. The broiler and hog operations with these impacts have more than 1,000 AU on-site (i.e., no operations with between 500 and 1,000 AU fall in the stress category). The dairy and cattle operations with stress impacts are those that have a ground water link to surface water. Although not presented here, the results of the two-tier structure at the 750 AU threshold are very similar in terms of number of operations affected. The results of this analysis are presented in the *Economic Analysis*.

Table 10-7 presents results for the three-tier structure, and show that 1,420 hog operations (17 percent of affected hog CAFOs under that alternative), 610 dairies (9 percent of operations), 330 broiler operations (2 percent), and 50 beef and heifer operations (1 percent) will be adversely impacted. Hog operations with stress impacts all have more than 1,000 AU. Affected broiler facilities include operations with more than 1,000 AU, as well as operations with less than 1,000 AU. Dairy and cattle operations in the stress category are operations that have a hydrologic link from ground water to surface water. Based on these results, EPA is proposing that the proposed regulations are economically achievable.

In the hog and broiler sectors, EPA also evaluated financial impacts with an assumption of cost passthrough. For the purpose of this analysis, EPA assumes that the hog sector could passthrough 46 percent of compliance costs and the broiler sector could passthrough 35 percent of compliance costs. EPA derived these estimates from price elasticities of supply and demand for each sector reported in the academic literature. More detailed information is provided in Section 4 and Appendix C of the *Economic Analysis*. Assuming these levels of cost passthrough in these sectors, the magnitude of the estimated impacts decreases to the affordable or moderate impact category. Even in light of the uncertainty of cost passthrough (both in terms of whether the operations are able to pass cost increases up the marketing chain and the amount of any cost passthrough), EPA proposes that the proposed regulations will be economically achievable to all hog and broiler operations.

Although EPA's analysis does not consider cost passthrough among cattle or dairy operations, EPA does expect that long-run market and structural adjustment by producers in this sector will diminish the estimated impacts. However, EPA did determine that an evaluation of economic impacts to dairy producers would require that EPA assume cost passthrough levels in excess of 50 percent before operations in the financial stress category would, instead, fall into the affordable or moderate impact category. EPA did not conduct a similar evaluation of estimated impacts to beef cattle and heifer operations.

EPA believes that the assumptions of cost passthrough are appropriate for the pork and poultry sectors. As discussed in Section VI, EPA expects that meat packing plants and slaughtering facilities in the pork and poultry industries may be affected by the proposed co-permitting requirements in today's proposed regulations. Given the efficiency of integration and closer producer-processor linkages, the processor has an incentive to ensure a continued production by contract growers. EPA expects that these operations will be able to pass on a portion of all incurred compliance costs and will, thus, more easily absorb the costs associated with today's proposed rule. This passthrough may be achieved

either through higher contract prices or through processor-subsidized centralized off-site or on-site waste treatment and/or development of marketable uses for manure.

EPA recognizes, however, that some industry representatives do not support assumptions of cost passthrough from contract producers to integrators, as also noted by many small entity representatives during the SBREFA outreach process as well as by members of the SBAR Panel. These commenters have noted that integrators have a bargaining advantage in negotiating contracts, which may ultimately allow them to force producers to incur all compliance costs as well as allow them to pass any additional costs down to growers that may be incurred by the processing firm. To examine this issue, EPA conducted an extensive review of the agricultural literature on market power in each of the livestock and poultry sectors and concluded that there is little evidence to suggest that increased production costs would be prevented from being passed on through the market levels. This information is provided in the rulemaking record. Given the uncertainty of whether costs will be passed on, EPA's results are presented assuming some degree of cost passthrough and also no cost passthrough (i.e., the highest level of impacts projected). EPA requests comment on its cost passthrough assumptions. Although EPA does consider the results of both of these analyses in making its determination of economic achievability, EPA's overall conclusions do not rely on assumptions of cost passthrough.

Finally, EPA believes its estimated impacts may be overstated since the analysis does not quantify various cost offsets that are available to most operations. One source of potential cost offset is cost share and technical assistance available to operators for on-site improvements that are available from various state and federal programs, such as the Environmental Quality Incentives Program (EQIP) administered by USDA. Another source of cost offset is revenue from manure sales, particularly of relatively higher value dry poultry litter. EPA's analysis does not account for these possible sources of cost offsets because the amount of cost offset is likely variable among facilities, depending on certain site-specific conditions. If EPA were to quantify the potential cost offsets as part of its analysis, this would further support EPA's proposed determination that the proposed requirements are economically achievable to affected operations. This analysis and additional supporting documentation is provided in Section 6 of the *Economic Analysis*.

Appendix D of the *Economic Analysis* provides results of sensitivity analyses, conducted by EPA, to examine the impact under differing model assumptions. This analysis examine the change in the modeling results from varying the baseline assumptions on gross and net cash income, debt-to-asset ratios as well as other variability factors for model CAFOs. These sensitivity analyses conclude that the results presented here are stable across a range of possible modeling assumptions. EPA also conducted sensitivity analysis of the compliance costs developed for the purpose of estimating CAFO level impacts, as documented in the *Development Document*.

Table 10-6. Impacted Operations Under the Two-Tier Structure (BAT Option/Scenario 4a)

Sector	Number of CAFOs	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		Zero Cost Passthrough			Partial Cost Passthrough		
		(Number of Affected Operations)					
Fed Cattle	3,080	2,830	240	10	ND	ND	ND
Veal	90	90	0	0	ND	ND	ND
Heifer	800	680	120	0	ND	ND	ND
Dairy	3,760	3,240	200	320	ND	ND	ND
Hogs: GF ^{1/}	2,690	1,710	180	810	2,690	0	0
Hogs: FF ^{1/}	5,860	5,210	30	610	5,860	0	0
Broilers ^{4/}	9,780	1,960	7,670	150	8,610	1,170	0
Layers - Wet ^{2/}	360	360	0	0	ND	ND	ND
Layers - Dry ^{2/}	1,280	1,280	0	0	ND	ND	ND
Turkeys	1,280	1,230	50	0	ND	ND	ND
Total ^{3/}	28,970	18,580	8,490	1,890	26,840	1,800	330

Source: USEPA. See *Economic Analysis*. Impact estimates shown include impacts to designated operations. Numbers may not add due to rounding. ND = Not Determined. Option/Scenario definitions provided in Table 10-2. Category definitions (“Affordable,” “Moderate” and “Stress”) are provided in Section X.F.1.

^{1/} “Hogs: FF” are farrow-finish (includes breeder and nursery pigs); “Hogs: GF” are grower-finish only.

^{2/} “Layers: wet” are operations with liquid manure systems; “Layers: dry” are operations with dry systems.

^{3/} “Total” does not adjust for operations with mixed animal types, for comparison purposes, to avoid understating costs at operations with more than one animal type that may incur costs to comply with the proposed requirements for each type of animal that is raised on-site.

Table 10-7. Impacted Operations Under the Three-Tier Structure (BAT Option/Scenario 3)

Sector	Number of CAFOs	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		Zero Cost Passthrough			Partial Cost Passthrough		
		(Number of Affected Operations)					
Fed Cattle	3,210	2,540	650	20	ND	ND	ND
Veal	140	140	0	0	ND	ND	ND
Heifer	980	800	150	30	ND	ND	ND
Dairy	6,480	5,300	560	610	ND	ND	ND
Hogs: GF ^{1/}	2,650	1,660	190	810	2,650	0	0

Hogs: FF ^{1/}	5,710	5,070	30	610	5,710	0	0
Broilers	13,740	1,850	11,560	330	12,320	1,440	0
Layers - Wet ^{2/}	360	360	0	0	ND	ND	ND
Layers - Dry ^{2/}	1,660	1,660	0	0	ND	ND	ND
Turkeys	2,060	1,950	110	0	ND	ND	ND
Total ^{3/}	37,000	21,300	13,250	2,410	33,410	2,930	660

Source: USEPA. See *Economic Analysis*. Impact estimates shown include impacts to designated operations. Numbers may not add due to rounding. ND = Not Determined. Option/Scenario definitions provided in Table 10-2. Category definitions (“Affordable,” “Moderate” and “Stress”) are provided in Section X.F.1.

^{1/} “Hogs: FF” are farrow-finish (includes breeder and nursery pigs); “Hogs: GF” are grower-finish only.

^{2/} “Layers: wet” are operations with liquid manure systems; “Layers: dry” are operations with dry systems.

^{3/} “Total” does not adjust for operations with mixed animal types, for comparison purposes, to avoid understating costs at operations with more than one animal type that may incur costs to comply with the proposed requirements for each type of animal that is raised on-site.

b. Economic Impacts to Existing CAFOs under Alternative Regulatory Options and Scenarios

Table 10-8 presents estimated financial stress impacts to model CAFOs under alternative option and scenario combinations, assuming that no costs passthrough. The results shown are aggregated and combine impacts in the cattle sector (including all beef, veal and heifer operations), hog sector (including all phases of production), and poultry sector (including all broiler, egg laying and turkey operations). Results are shown for Scenario 4a (two-tier), Scenario 3 (three-tier), and Scenario 4b. Results are shown for technology Options 1 through 5. Additional information is available in the *Economic Analysis* that supports today’s rulemaking.

As shown in Table 10-8, the number of potential closures range from 610 operations (Option 1 in combination with all Scenarios) to more than 14,000 potential closures (Option 4/Scenario 4b). Among options, the number of possible closures are highest under the more stringent options, including Options 3A (i.e., requires groundwater controls at operations where there is a determined groundwater hydrologic connection to surface waters), Option 4 (groundwater controls and surface water sampling), and Option 5 (i.e., zero discharge from the animal production area with no exception for storm events). Differences across scenarios reflects differences in the number of affected operations; accordingly, the number of closures is greatest under Scenario 4b that would define as CAFOs all confinement operations with more than 300 AU.

Table 10-8. “Stress” Impacts at CAFOs under Alternative Options/Scenarios

Sector	Number of CAFOs	Option 1	Option 2	Option 3	Option 3A ^{1/}	Option 4	Option 5	BAT Option
		(Number of Operations)						
BAT Option / NPDES Scenario 4a (>500 AU)								
Cattle	3,960	0	0	0	10	0	30	10
Dairy	3,760	0	0	0	320	0	0	320
Hogs	8,550	610	300	230	310	570	1,420	1,420
Poultry	12,700	0	150	260	100	6,660	150	150
Total ^{2/}	28,970	610	450	490	730	7,230	1,590	1,890
BAT Option / NPDES Scenario 4b (>300 AU)								
Cattle	5,330	0	0	0	90	30	180	90
Dairy	7,140	0	0	0	700	0	0	700
Hogs	14,370	610	300	230	330	570	1,420	1,420
Poultry	18,300	0	320	470	380	11,030	320	320
Total ^{2/}	45,140	610	620	700	1,500	11,630	1,910	2,530
BAT Option / NPDES Scenario 3 (>300 AU with certification)								
Cattle	4,330	0	0	0	50	0	100	50
Dairy	6,480	0	0	0	610	0	0	610
Hogs	8,360	610	300	230	320	570	1,420	1,420
Poultry	17,830	0	330	470	370	10,740	330	330
Total ^{2/}	37,000	610	630	700	1,350	11,310	1,850	2,410

Source: USEPA. See *Economic Analysis*. Impact estimates shown include impacts to designated operations. Numbers may not add due to rounding. ND = Not Determined. Option/Scenario definitions provided in Table 10-2.

^{1/} Option 3A impacts reflect operations where there is a determined groundwater hydrologic connection to surface waters (assumed at 24 percent of the affected operations).

^{2/} "Total" does not adjust for operations with mixed animal types, for comparison purposes, to avoid understating costs at operations with more than one animal type that may incur costs to comply with the proposed requirements for each type of animal that is raised on-site. The number of CAFOs shown includes expected defined CAFOs only and excludes designated facilities.

c. Economic Analysis of New CAFOs from NSPS under the Proposed Regulations

For new sources, EPA is proposing that operations meet performance standards, as specified by the BAT requirements (Option 3 NSPS, beef and dairy subcategories, and Option 5 NSPS, swine and poultry subcategories), with the additional requirement that all new hog and poultry operations also implement groundwater controls where there is a hydrologic link to surface water (Option 3 NSPS, swine and poultry subcategories). Additional information on new source requirements is provided in Section VIII of this document.

In general, EPA believes that new CAFOs will be able to comply at costs that are similar to, or less than, the costs for existing sources, because new sources can apply control technologies more efficiently than sources that need to retrofit for those technologies. New sources will be able to avoid these costs that will be incurred by existing sources. Furthermore, EPA believes that new sources can avoid the costs associated with ground water protection through careful site selection. There is nothing about today's proposal that would give existing operators a cost advantage over new feedlot operators; therefore, new source standards are not expected to present a barrier to entry for new facilities.

EPA's analysis of the NSPS costs indicate that requiring Option 3 for new sources in the beef and dairy subcategories and both Option 3 NSPS and Option 5 NSPS for the swine and poultry subcategories ("Option 5+3 NSPS") would be affordable and would not create any barriers to entry into those sectors. The basis for this determination is as follows. Option 5+3 NSPS is considered equivalent to Option 5 for new sources in terms of cost. EPA is proposing that Option 3 NSPS for beef and dairy subcategories and Option 5 NSPS for swine and poultry subcategories is economically achievable for existing sources. Since the estimated costs for these options are the same as or less expensive than costs for these same options for existing sources, no barriers to entry are created.

Under Option 5+3 NSPS, costs for new sources in the swine and poultry subcategories would be the same as or less than those for equivalent existing sources (BAT under Option 5), as long as new sources are not sited in areas where there is a hydrologic link to surface water. New operations are not expected to incur costs estimated under Option 3A, which includes groundwater controls, since they are not likely to establish a new operation where there is a hydrologic link to surface waters (and where operating expenses would be more costly). Thus EPA assumes that the costs for Option 5+3 NSPS are the same as those for Option 5 NSPS, which in turn are the same as those for Option 5 BAT. EPA is proposing that Option 5 BAT is economically achievable for existing sources in the swine and poultry subcategories and therefore this same option should be affordable to new sources. Furthermore, because costs to new sources for meeting Option 5 NSPS are no more expensive than the costs for existing sources to meet Option 5 BAT, there should be no barriers to entry.

The estimated costs of Option 3 NSPS for the beef and dairy subcategories are the same as or less than the costs for Option 3 BAT, which includes retrofitting costs. EPA is proposing that Option 3

BAT is economically achievable for existing sources in these sectors. Since Option 3 NSPS is no more expensive than Option 3 BAT, this option should also be economically achievable for new sources and should not create any barriers to entry. In fact, new sources may be able to avoid the cost of implementing groundwater controls through careful site selection, thus their costs may be substantially lower than similar existing sources.

EPA did not consider an option similar to Option 5+3 NSPS for the beef and dairy subcategories (Option 8 NSPS), but found this option to be substantially more expensive than Option 3 BAT for the dairy sector and could create barriers to entry for this sector. Therefore, EPA rejected this option. See Section 5 of the *Economic Analysis* for more details on these analyses.

d. Economic Impacts to Offsite Recipients of CAFO Manure of the Proposed Regulations

As discussed in Section X.D.1, EPA assesses the economic impact to offsite recipients of CAFO manure by comparing the estimated cost of this requirement to both aggregate and average per-farm production costs and revenues. For the purpose of this analysis, EPA assumes that these regulatory costs will be borne by a non-CAFO farming operation that uses animal manures as a fertilizer substitute.

EPA estimates that 17,900 to 21,200 farming operations will incur \$9.6 million to \$11.3 million in costs associated with requirements for the offsite transfer of CAFO manure (Tables 10-3 and Table 10-4). This translates to an average cost of roughly \$540 per recipient. As reported by USDA, farm production expenses in 1997 totaled \$150.6 billion nationwide. Revenue from farm sales totaled \$196.9 billion. Averaged across the total number of farms, average per-farm costs and revenues were \$78,800 and \$113,000 in 1997, respectively. Using these data, the ratio of incremental costs to offsite recipients as a share of average operating expenses and average farm revenue is well under one percent. Total estimated compliance costs (\$9.6 million to \$11.3 million annually) as a share of aggregate farm expenses and sales is also under one percent. This analysis is provided in Section 5 of the *Economic Analysis*.

2. Processor Level Analysis

As discussed in Section X.D.2, EPA did not conduct a detailed estimate of the costs and impacts that would accrue to individual co-permittees due to lack of data and market information. However, EPA believes that the framework used to estimate costs to CAFO provides a means to evaluate the possible upper bound of costs that could accrue to potential co-permittees, based on the potential share of (pre-tax) costs that may be passed on from the CAFO (described in Section X.D.2). EPA is proposing that this amount approximates the magnitude of the costs that may be incurred by processing firms in those industries that may be affected by the proposed co-permitting requirements.

Table 10-9 presents the results of EPA’s analysis. This analysis focuses on the potential magnitude of costs to co-permittees in the pork and poultry sectors only since these are the sectors where the proposed co-permitting requirements could affect processing facilities. However, EPA did not evaluate the potential magnitude of costs to egg and turkey processors because the compliance costs to CAFOs in these industries is projected to be easily absorbed by CAFOs (see Section X.F.1). The results presented in Table 10-9 are for the pork and broiler industries only. EPA also did not evaluate the potential costs to cattle and dairy processors because EPA does not expect that the proposed co-permitting requirements to affect meat packing and processing facilities in these industries, for reasons outlined in Section VI.

The potential magnitude of costs to co-permittees is derived from the amount of cost passthrough assumed in the CAFO level analysis, described in Section X.F.1. For this analysis, two scenarios of cost passthrough to processors are evaluated: partial cost passthrough (greater than zero) and also 100 percent cost passthrough. EPA’s partial cost passthrough scenario assumes that 46 percent of all hog compliance costs and that 35 percent of all broiler compliance costs are passed on to the food processing sectors. Based on the results of this analysis, EPA estimates that the range of potential annual costs to hog processors is \$135 million (partial cost passthrough) to \$306 million (full cost passthrough). EPA estimates that the range of potential annual costs to broiler processors as \$34 million (partial cost passthrough) to \$117 million (full cost passthrough). These results are shown in Table 10-9 and are expressed in 1999 pre-tax dollars.

To assess the magnitude of impacts that could accrue to processors using this approach, EPA compares the passed through compliance costs to both aggregate processor costs of production and to revenues (a sales test). The results of this analysis are shown in Table 10-9 and are presented in terms of the equivalent 1997 compliance cost as compared to 1997 data from the Department of Commerce on the revenue and costs among processors in the hog and broiler industries. As shown, EPA estimates that, even under full cost passthrough, incremental cost changes are less than two percent and passed through compliance costs as a share of revenue are estimated at less than one percent. EPA solicits comment on this approach. Additional information is provided in the *Economic Analysis*.

Table 10-9. Impact of Passed Through Compliance Costs under Co-proposed Alternatives

Sector	Passed Through Compliance Cost		1997 Revenues	1997 Delivered Cost	Passed through Cost-to-Revenues		Passed through Cost-to-Delivered Cost	
	Partial CPT	100% CPT			Partial CPT	100% CPT	Partial CPT	100% CPT
	(\$1999, million)				(\$1997, million)		(percent, comparing costs in \$1997)	
Hog Processors								
Two-Tier	\$135	\$294	\$38,500	\$15,700	0.3%	0.7%	0.8%	1.8%

Three-Tier	\$141	\$306			0.4%	0.8%	0.9%	1.9%
Broiler Meat Processors								
Two-Tier	\$34	\$97	\$17,700	\$9,100	0.2%	0.5%	0.4%	1.0%
Three-Tier	\$41	\$117			0.2%	0.6%	0.4%	1.2%

Source: USEPA. 1997 processor revenues and costs are from the Department of Commerce. Option/Scenario definitions provided in Table 10-2. Estimated compliance costs are pre-tax. CPT = Cost passthrough. Partial CPT assumes 46% CPT for the hog sector and 35% CPT for the broiler sector.

3. Market Level Analysis

As discussed in Section X.D.3, EPA's market analysis evaluates the effects of the proposed regulations on commodity prices and quantities at the national level. EPA's market model predicts that the proposed regulations will not result in significant industry-level changes in production and prices for most sectors. Tables 10-10 and 10-11 show predicted farm and retail price changes across the two-tier (500 AU threshold) and three-tier structures. For comparison purposes, the average annual percentage change in price from 1990 to 1998 is shown. Analyses of other technology options and scenarios considered by EPA are provided in the record.

EPA expects that predicted changes in animal production may raise producer prices, as the market adjusts to the proposed regulatory requirements. For most sectors, EPA estimates that producer price changes will rise by less than one percent of the pre-regulation baseline price (Table 10-10). The exception is in the hog sector, where estimated compliance costs slightly exceed one percent of the baseline price. At the retail level, EPA expects that the proposed regulations will not have a substantial impact on overall production or consumer prices for value-added meat, eggs, and fluid milk and dairy products. EPA estimates that retail price increases resulting from the proposed regulations will be under one percent of baseline prices in all sectors, averaging below the rate of general price inflation for all foods (Table 10-11). In terms of retail level price changes, EPA estimates that poultry and red meat prices will rise about one cent per pound. EPA also estimates that egg prices will rise by about one cent per dozen and that milk prices will rise by about one cent per gallon.

Appendix D of the *Economic Analysis* provides results of sensitivity analyses, conducted by EPA, to examine the impact under differing model assumptions. EPA examined variations in the price elasticities and prices assumed for these industries, based on information reported in the agricultural literature and statistical compendiums. These sensitivity analyses demonstrate that the results presented here are stable across a range of possible modeling assumptions.

Table 10-10. Estimated Increases in Farm Prices Under the Co-proposed Alternatives

Option/Scenario	Beef (\$/cwt)	Dairy (\$/cwt)	Hogs (\$/cwt)	Broilers (cents/lb)	Layers (cents/doz.)	Turkeys (cents/lb)
Pre-reg. Avg Price	\$68.65	\$13.90	\$56.41	38.43	72.51	41.66
Avg. Chg 90-98 (%)	4.6%	8.0%	15.2%	5.7%	11.5%	4.4%
Two-Tier	\$0.22	\$0.06	\$0.61	0.19	0.14	0.13
Three-Tier	\$0.24	\$0.08	\$0.66	0.23	0.15	0.16

Source: USEPA, except historical data that are from USDA. Option/Scenario definitions provided in Table 10-2.

Table 10-11. Estimated Increases in Retail Prices Under the Co-proposed Alternatives

Option/Scenario	Beef (\$/lb)	Dairy (Index)	Hogs (\$/lb)	Broilers (cents/lb)	Layers (cents/doz.)	Turkeys (cents/lb)
Pre-reg. Avg Price	\$2.91	145.50	\$2.55	156.86	110.11	109.18
Avg. Chg 90-98 (%)	2.3%	2.4%	5.1%	3.0%	7.2%	2.4%
Two-Tier	\$0.00	0.61	\$0.01	0.19	0.14	0.13
Three-Tier	\$0.00	0.78	\$0.01	0.23	0.15	0.16

Source: USEPA, except historical data that are from USDA. Option/Scenario definitions provided in Table 10-2.

EPA does not expect that the proposed regulations will result in significant changes in aggregate employment or national economic output, measured in terms of Gross Domestic Product (GDP). EPA expects, however, that there will be losses in employment and economic output associated with decreases in animal production due to rising compliance costs. These losses are estimated throughout the entire economy, using available modeling approaches, and are not attributable to the regulated community only. This analysis also does not adjust for offsetting increases in other parts of the economy and other sector employment that may be stimulated as a result of the proposed regulations, such as the construction and farm services sectors.

Table 10-12 show these predicted changes. Employment losses are measured in full-time equivalents (FTEs) per year, including both direct and indirect employment. Under the two-tier structure (500 AU threshold), EPA estimates that the reduction in aggregate national level of employment is 16,600 FTEs. Under the three-tier structure, EPA estimates total aggregate job losses at 18,900 FTEs. This projected change is modest when compared to total national employment, estimated at about 129.6 million jobs in 1997. EPA's estimate of the aggregate reductions in national economic output is \$1.7 billion under the two-tier structure. Under the three-tier structure, EPA estimates the loss to GDP at \$1.9 billion. This projected change is also modest when compared to total GDP, estimated at \$8.3 trillion in 1997. Additional information is available in the *Economic Analysis*.

Table 10-12. Estimated Decreases in Employment and Economic Output

Option/ Scenario	Beef	Dairy	Hogs	Poultry	Total
Estimated Decreases in Employment (Number of FTEs)					
Two-Tier	4,600	3,200	6,400	2,400	16,600
Three-Tier	4,900	4,100	6,900	3,000	18,900
Estimated Decreases in Economic Output (\$GDP)					
Two-Tier	\$476	\$307	\$681	\$251	\$1,715
Three-Tier	\$510	\$396	\$734	\$306	\$1,946

Source: USEPA. Option/Scenario definitions provided in Table 10-2. FTE = Full-time equivalent.

G. Additional Impacts

1. Costs to the NPDES Permitting Authority

Additional costs will be incurred by the NPDES permitting authority to alter existing state programs and obtain EPA approval to develop new permits, review new permit applications and issue revised permits that meet the proposed regulatory requirements. Under the proposed rule, NPDES permitting authorities will incur administration costs related to the development, issuance, and tracking of general or individual permits.

State and federal administrative costs to issue a general permit include costs for permit development, public notice and response to comments, and public hearings. States and EPA may also incur costs each time a facility operator applies for coverage under a general permit due to the expenses associated with a Notice of Intent (NOI). These per-facility administrative costs include initial facility inspections and annual record keeping expenses associated with tracking NOIs. Administrative costs for an individual permit include application review by a permit writer, public notice, and response to comments. An initial facility inspection may also be necessary. EPA developed its unit permit costs assumed for this analysis based on information obtained from a state permitting personnel. The cost assumptions used to estimate develop, review, and approve permits and inspect facilities are presented in the *Development Document*.

EPA assumes that, under the two-tier structure, an estimated 25,590 CAFOs would be permitted. This estimate consists of 24,760 State permits (17,340 General and 7,420 Individual permits) and 1,030 Federal permits (720 General and 310 Individual permits). Under the three-tier structure, an estimated 31,930 CAFOs would be permitted, consisting of 30,650 State permits

(21,460 General and 9,190 Individual permits) and 1,280 Federal permits (900 General and 380 Individual permits). Information on the estimated number of permits required under other regulatory alternatives is provided in the *Economic Analysis*. The basis for these estimates is described in the *Development Document* that supports this rulemaking.

As shown in Table 10-13, under the two-tier structure, EPA estimates State and Federal administrative costs to implement the permit program to be \$6.2 million per year: \$5.9 million for states and \$350,000 for EPA. Under the three-tier structure, EPA estimates State and Federal administrative costs to implement the permit program to be \$7.7 million per year: \$7.3 million for states and \$416,000 for EPA. EPA expects that the bulk (95 percent) of estimated administrative costs will be incurred by the state permitting authority. EPA has expressed these costs in 1999 dollars, annualized over the 5-year permit life using a seven percent discount rate. The range of costs across each of the regulatory options is \$4.2 million to \$9.1 million annually (alternatives Scenario 1 and Scenario 4b, respectively). See Table 10-13. (EPA did not estimate permit authority costs under alternative NPDES Scenarios 5 and 6, described in Table 10-2.) This analysis is available in the record and is summarized in Section 10 of the *Economic Analysis*.

This analysis was conducted to evaluate the costs of the proposed rule to governments, as required under the Unfunded Mandates Reform Act (UMRA), as discussed in Section XIII.C of this preamble.

Table 10-13. Annual State and Federal Administrative Costs, \$1999

Regulatory scenario	State	Federal	Total
Scenario 1	\$3,922,990	\$268,630	\$4,191,620
Scenario 2	\$7,233,470	\$413,060	\$7,646,530
Scenario 3 (“Three-tier”)	\$7,279,560	\$415,600	\$7,695,160
Scenario 4a (“Two-tier”)	\$5,910,750	\$351,090	\$6,224,040
Scenario 4b	\$8,645,520	\$483,010	\$9,128,530

Source: USEPA. See *Economic Analysis*. Other supporting documentation is in the *Development Document*.

2. Community Impacts

As discussed in Section X.F.3, EPA does not expect that the proposed regulations will result in significant increases in retail food prices or reductions in national level employment.

EPA also considered other community level impacts associated with this rulemaking. In particular, EPA considered whether the proposed rule could have community level and/or regional

impacts if it substantially altered the competitive position of livestock and poultry production across the nation, or led to growth or reductions in farm production (in- or out-migration) in different regions and communities. Ongoing structural and technological change in these industries has influenced where farmers operate and has contributed to locational shifts between the more traditional production regions and the more emergent, nontraditional regions. Production is growing rapidly in these regions due to competitive pressures from more specialized producers who face lower per-unit costs of production. This is especially true in hog and dairy production.

To evaluate the potential for differential impacts among farm production regions, EPA examined employment impacts by region. EPA concluded from this analysis that more traditional agricultural regions would not be disproportionately affected by the proposed regulations. This analysis is provided in the *Economic Analysis*.

EPA does not expect that today's proposed requirements will have a significant impact on where animals are raised. On one hand, on-site improvements in waste management and disposal, as required by the proposed regulations, could accelerate recent shifts in production to more nontraditional regions as higher cost producers in some regions exit the market to avoid relatively higher retrofitting associated with bringing existing facilities into compliance. On the other hand, the proposed regulations may favor more traditional production systems where operators grow both livestock and crops, since these operations tend to have available cropland for land application of manure nutrients. These types of operations tend to be more diverse and not as specialized and, generally, tend to be smaller in size. Long-standing farm services and input supply industries in these areas could likewise benefit from the proposed rule, given the need to support on-site improvements in manure management and disposal. Local and regional governments, as well as other non-agricultural enterprises, would also benefit.

3. Foreign Trade Impacts

Foreign trade impacts are difficult to predict, since agricultural exports are determined by economic conditions in foreign markets and changes in the international exchange rate for the U.S. dollar. However, EPA predicts that foreign trade impacts as a result of the proposed regulations will be minor given the relatively small projected changes in overall supply and demand for these products and the slight increase in market prices, as described in Section X.F.3.

Despite its position as one of the largest agricultural producers in the world, historically the U.S. has not been a major player in world markets for red meat (beef and pork) or dairy products. In fact, until recently, the U.S. was a net importer of these products. The presence of a large domestic market for value-added meat and dairy products has limited U.S. reliance on developing export markets for its products. As the U.S. has taken steps to expand export markets for red meat and dairy products, one major obstacle has been that it remains a relatively high cost producer of these products compared to other net exporters, such as New Zealand, Australia, and Latin America, as well as other more established and government-subsidized exporting countries, including the European Union and Canada. Increasingly, however, continued efficiency gains and low-cost feed is making the U.S. more

competitive in world markets for these products, particularly for red meat. While today's proposed regulations may raise production costs and potentially reduce production quantities that would otherwise be available for export, EPA believes that any quantity and price changes resulting from the proposed requirements will not significantly alter the competitiveness of U.S. export markets for red meat or dairy foods.

In contrast, U.S. poultry products account for a controlling share of world trade and exports account for a sizable and growing share of annual U.S. production. Given the established presence of the U.S. in world poultry markets and the relative strength in export demand for these products, EPA does not expect that the predicted quantity and price changes resulting from today's proposed regulations will have a significant impact on the competitiveness of U.S. poultry exports.

As part of its market analysis, EPA evaluated the potential for changes in traded volumes, such as increases in imports and decreases in exports, and concluded that volume trade will not be significantly impacted by today's proposed regulations. EPA estimates that imports (exports) will increase (decrease) by less than 1 percent compared to baseline (pre-regulation) levels in each of the commodity sectors. By sector, the potential change in imports compared to baseline trade levels ranges from a 0.02 percent increase in broiler imports to a 0.34 percent increase in dairy product imports. The predicted drop in U.S. exports ranges from a 0.01 percent reduction in turkey exports to a 0.25 percent reduction in hog exports.

H. Cost-Effectiveness Analysis

As part of the process of developing effluent limitations guidelines and standards, EPA typically conducts a cost-effectiveness analysis to compare the efficiencies of regulatory options for removing pollutants and to compare the proposed BAT option to other regulatory alternatives that were considered by EPA. For the purpose of this regulatory analysis, EPA defines cost-effectiveness as the incremental annualized cost of a technology option per incremental pound of pollutant removed annually by that option. The analyses presented in this section include a standard cost-effectiveness (C-E) analysis for toxic pollutants, but also expand upon EPA's more traditional approach to include an analysis of the cost-effectiveness of removing nutrients and sediments. This expanded approach is more appropriate for evaluating the broad range of pollutants in animal manure and wastewater.

The American Society of Agricultural Engineers (ASAE) reports that the constituents present in livestock and poultry manure include: boron, cadmium, calcium, chlorine, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, sodium, sulfur, zinc, nitrogen and phosphorus species, total suspended solids, and pathogens. Of these pollutants, EPA's standard C-E analysis is suitable to analyze only the removal of metals and metallic compounds. EPA's standard C-E analysis does not adequately address removals of nutrients, total suspended solids, and pathogens. To account for the estimated removals of nutrients and sediments under the proposed regulations in the analysis, the Agency has developed an alternative approach to evaluate the pollutant removal effectiveness relative

to cost. At this time, EPA has not developed an approach that would allow a similar assessment of pathogen removals. Section 10 of the *Economic Analysis* describes the methodology, data, and results of this analysis. (EPA did not estimate cost-effectiveness for the alternative NPDES Scenarios 5 and 6, described in Table 10-2.)

For this analysis, EPA has estimated the expected reduction of select pollutants for each of the regulatory options considered. These estimates measure the amount of nutrients, sediments, metals and metallic compounds that originate from animal production areas that would be removed under a post-regulation scenario (as compared to a baseline scenario) and not reach U.S. waters. Additional information on EPA's estimated loadings and removals under post-compliance conditions is provided in the *Development Document* and the *Benefits Analysis* that support today's rulemaking.

1. Cost-Effectiveness: Priority Pollutants

For this rulemaking, EPA identified a subset of metallic compounds for use in the C-E analysis: zinc, copper cadmium, nickel, arsenic, and lead. These six compounds are a subset of all the toxic compounds reported to be present in farm animal manure (varies by animal species). Therefore, if loading reductions of all priority pollutants in manure were evaluated, the proposed regulations would likely be even more cost-effective (i.e., lower cost per pound-equivalent removal).

EPA calculates cost-effectiveness as the incremental annual cost of a pollution control option per incremental pollutant removal. In C-E analyses, EPA measures pollutant removals in toxicity normalized units called "pounds-equivalent," where the pounds-equivalent removed for a particular pollutant is determined by multiplying the number of pounds of a pollutant removed by each option by a toxicity weighting factor. The toxic weighting factors account for the differences in toxicity among pollutants and are derived using ambient water quality criteria. The cost-effectiveness value, therefore, represents the unit cost of removing an additional pound-equivalent of pollutants. EPA calculates the cost-effectiveness of a regulatory option as the ratio of pre-tax annualized costs of an option to the annual pounds-equivalent removed by that option, expressed as the average or incremental cost-effectiveness for that option. EPA typically presents C-E results in 1981 dollars for comparison purposes with other regulations. EPA uses these estimated compliance costs to calculate the cost-effectiveness of the proposed regulations, which include total estimated costs to CAFOs and offsite recipients of CAFO manure (Section X.E) and costs to the permitting authority (Section X.G.1). Additional detail on this approach is provided in Appendix E of the *Economic Analysis*.

Cost-effectiveness results for select regulatory alternatives are presented in Table 10-14. Results shown in Table 10-14 include the BAT Option (Option 3 for beef and dairy subcategories and Option 5 for the swine and poultry subcategories) and Option 3+5 (both Option 3 and 5 for all subcategories). Options are shown for four CAFO coverage scenarios, including CAFOs with more than 1,000 AU and CAFOs with more than 500 AU (two-tier structure), and operations with more than 300 AU, both under Scenario 4b and as defined under Scenario 3 (three-tier structure). The

differences in CAFO coverage provide an upper and lower bound of the analysis to roughly depict the alternative NPDES scenarios. Both incremental and average C-E values are shown.

Incremental cost-effectiveness is the appropriate measure for comparing one regulatory alternative to another for the same subcategory. In general, the lower the incremental C-E value, the more cost-efficient the regulatory option is in removing pollutants, taking into account their toxicity. For this rulemaking, EPA compares the cost-effectiveness across alternative NPDES Scenarios to assess the Agency’s decision to define as CAFO operations with more than 500 AU (two-tier structure) and, alternatively, some operations with more than 300 AU (two-tier structure).

As shown in Table 10-14, the BAT Option is the most cost-efficient under each of the co-proposed alternatives. Under both the two-tier (500 AU) and three-tier structures, EPA estimates an incremental cost-effectiveness value of about \$30 per pounds-equivalent (lbs.-eq.) removed. This compares to the alternative Scenario 4b that have a higher estimated incremental cost-effectiveness (\$76/lbs.-eq., if all CAFOs with more than 1,000 AU are regulated). (Since the change in removals between Scenario 3 and Scenario 4b is zero, the incremental C-E value is “undefined.”) The BAT Option is also more efficient than requiring Option 3+5 for all subcategories, which has higher costs but results in no additional pollutant removals compared to the BAT Option. This is because the ELG options differ mostly in terms of their monitoring and sampling requirements but establish no additional pollutant controls. (Since the change in removals between the BAT Option and Option 3+5 is zero, the incremental C-E value is undefined.)

The average cost-effectiveness reflects the “increment” between no regulation and regulatory options shown. For the BAT Option, EPA estimates an average value at \$55 per lbs.-eq. to \$58 per lbs.-eq., depending on the proposed tier structure (Table 10-14). These estimated average values are low compared to the alternative NPDES scenarios since the average cost-effectiveness value is higher (\$76/lbs.-eq., if all CAFOs with more than 1,000 AU are regulated; \$62/lbs.-eq. for all CAFOs with more than 300 AU). This average cost is also low compared to previous ELG rulemakings, where estimated costs have, in some cases, exceeded \$100/lbs.-eq. removed. This information is provided in the *Economic Analysis*. In addition, as shown in Table 10-14, average cost-effectiveness is nearly twice as high under the more stringent Option 3+5 for all subcategories (estimated at more than \$100 per lbs.-eq. removed). Costs, but also removals, are lower under the less stringent Option 1 (also referred to as the “nitrogen-based” option) compared to other technology options. As described in Section VIII, EPA determined that this option would not represent the best available technology and so chose not to propose it. This analysis, along with additional results for each subcategory and other regulatory alternatives, is provided in Appendix E on the *Economic Analysis*.

Table 10-14. Cost-Effectiveness Results by Select Option/Scenario (\$1981)

Option	Total Annual		
		Average Cost- Effectiveness	Incremental Cost- Effectiveness

	Pound-Equivalents Removed ^{1/}	Total Cost ^{2/}		
	(million pounds)	(\$ millions)	(\$/lbs.-eq.)	
“BAT Option” ELG Option 3 (Beef/Dairy) and 5 (Swine/Poultry)				
>1000 AU	5.3	\$402	\$76	\$76
>500 AU “Two-tier”	8.4	\$491	\$58	\$29
Scenario 3 “Three-tier”	9.4	\$518	\$55	\$28
>300 AU	9.4	\$579	\$62	ND
ELG Option 3+5 (All Subcategories)				
>1000 AU	5.3	\$1,047	\$197	\$197
>500 AU “Two-tier”	8.4	\$1,212	\$144	\$53
Scenario 3 “Three-tier”	9.4	\$1,251	\$133	\$40
>300 AU	9.4	\$1,353	\$144	ND

Source: USEPA. See *Economic Analysis*. Option/Scenario definitions provided in Table 10-2. ND=Not Determined.

^{1/} Pound-equivalent removals are calculated from removals estimated by EPA’s loadings analysis, described in the *Benefits Analysis* and the *Development Document*, adjusting for each pollutant’s toxic weighting factor (as described in the *Economic Analysis*).

^{2/} Costs are pre-tax and indexed to 1981 dollars using the Construction Cost Index.

2. Cost-Effectiveness: Nutrients and Sediments

In addition to conducting a standard C-E analysis for select toxic pollutants (Section X.H.1), EPA also evaluated the cost-effectiveness of removing select non-conventional and conventional pollutants, including nitrogen, phosphorus, and sediments. For this analysis, sediments are used as a proxy for total suspended solids (TSS). This analysis does not follow the methodological approach of a standard C-E analysis. Instead, this analysis compares the estimated compliance cost per pound of pollutant removed to a recognized benchmark, such as EPA’s benchmark for conventional pollutants or other criteria for existing treatment, as reported in available cost-effectiveness studies.

The research in this area has mostly been conducted at municipal facilities, including publicly owned treatment works (POTWs) and wastewater treatment plants (WWTPs). Additional information is available based on the effectiveness of various nonpoint source controls and BMPs (Best Management Practices) and other pollutant control technologies that are commonly used to control runoff from agricultural lands. A summary of this literature is provided in the *Economic Analysis*. Benchmark estimates are used to evaluate the efficiency of regulatory options in removing a range of pollutants and to compare the results for each of the co-proposed tier structures to other regulatory alternatives. This approach also allows for an assessment of the types of management practices that will be implemented to comply with the proposed regulations.

Cost-effectiveness results for select regulatory alternatives are presented in Table 10-15. Results shown in Table 10-15 include the BAT Option (Option 3 for beef and dairy subcategories and Option 5 for the swine and poultry subcategories) and Option 3+5 (both Option 3 and 5 for all subcategories). Options are shown for four CAFO coverage scenarios, including CAFOs with more than 1,000 AU and CAFOs with more than 500 AU (two-tier structure), and operations with more than 300 AU, both under Scenario 4b and as defined under Scenario 3 (three-tier structure). The differences in CAFO coverage provide an upper and lower bound of the analysis to roughly depict the alternative NPDES scenarios.

The values in Table 10-15 are average cost-effectiveness values that reflect the increment between no regulation and the considered regulatory options. All costs are expressed in pre-tax 1999 dollars. Estimated compliance costs used to calculate the cost-effectiveness of the proposed regulations include total estimated costs to CAFOs and offsite recipients of CAFO manure (Section X.E) and costs to the permitting authority (Section X.G.1).

Under the co-proposed tier structures, EPA estimates an average cost-effectiveness of nutrient removal at \$4.60 per pound (two-tier) to \$4.30 per pound (three-tier) of nitrogen removed. For phosphorus removal, removal costs are estimated at \$2.10 to \$2.20 per pound of phosphorus removed (Table 10-15). For nitrogen, EPA uses a cost-effectiveness benchmark established by EPA's Chesapeake Bay Program to assess the costs to WWTPs to implement BNR (biological nutrient removal) retrofits. EPA's average benchmark estimate is about \$4 per pound of nitrogen removed at WWTPs in four states (MD, VA, PA, and NY), based on a range of costs of \$0.80 to \$5.90 per pound of nitrogen removed. Using this benchmark, EPA's estimated cost-effectiveness to remove nitrogen under the proposed regulations exceed EPA's average benchmark value, but falls within the estimated range of removal costs. However, EPA's estimated cost-effectiveness to remove phosphorus is lower than benchmark used for phosphorus of roughly \$10 per pound, reported in the agricultural research as the costs to remove phosphorus using various nonpoint source controls and management practices. Available data on phosphorus removal costs for industrial point source dischargers are much higher (exceed \$100 per pound of phosphorus removed). Based on these results, EPA concludes that these values are cost-effective.

Costs and removals are nearly twice as high under the more stringent Option 3+5 for all subcategories (Table 10-15). Costs and removals are lower under the less stringent Option 1, but EPA chose not to propose Option 1 because it does not represent the best available technology (also described in Section VIII of the preamble).

EPA estimates that the co-proposed thresholds (two-tier and three-tier structures) are more cost-effective compared to alternative AU thresholds, given slightly lower average cost-effectiveness values (Table 10-15). EPA estimates that the average cost-effectiveness to remove nitrogen is \$5.10 per pound of nitrogen removed at a threshold that would regulate as CAFOs all operations with more than 1,000 AU; the average cost-effectiveness is \$4.80 per pound of nitrogen removed at the alternative 300 AU threshold (Table 10-15). EPA estimates that the average cost-effectiveness to

remove phosphorus is \$2.50 per pound and \$2.30 per pound of phosphorus removed at the 1,000 AU and 300 AU threshold. EPA also estimates that the co-proposed tier structures are also the most cost-efficient, compared to other alternatives considered by EPA. These results, based on incremental cost-effectiveness values, are provided in the *Economic Analysis*.

Table 10-15 also shows that the cost to remove sediments under the BAT Option/Scenario is estimated at \$0.003 per pound of sediment removal (1999 dollars). This estimated per-pound removal cost is low compared to EPA’s POTW benchmark for conventional pollutants. This benchmark measures the potential costs per pound of TSS and BOD (biological nutrient demand) removed for an “average” POTW (see 51 FR 24982). Indexed to 1999 dollars, EPA’s benchmark costs are about \$0.70 per pound of TSS and BOD removed. The average cost-effectiveness of sediment removal under the BAT Option/Scenario is lower than under the alternative options. Option 1 results across the range of NPDES Scenarios are estimated at about \$0.05 per-pound removal of sediments. This analysis, along with additional results for each subcategory and other regulatory alternatives, is provided in Appendix E on the *Economic Analysis*.

Table 10-15. Cost-Effectiveness Results by Select Option/Scenario (\$1999)

Option/ Scenario	Total Cost ^{1/}	Sediments	Nitrogen	Phosphorus	Sediments	Nitrogen	Phosphorus
	(\$m 1999)	(million pounds of removals)			(average \$ per pound removed)		
“BAT Option” ELG Option 3 (Beef/Dairy) and 5 (Swine/Poultry)							
>1000 AU	\$688	209050	136	280	\$0.003	\$5.1	\$2.5
>500 AU “Two-tier”	\$840	299708	182	377	\$0.003	\$4.6	\$2.2
>300 AU “Three-tier”	\$887	335456	206	425	\$0.003	\$4.3	\$2.1
>300 AU	\$991	335456	206	425	\$0.003	\$4.8	\$2.3
ELG Option 3+5 (All Subcategories)							
>1000 AU	\$1,791	209050	136	280	\$0.009	\$13.2	\$6.4
>500 AU “Two-tier”	\$2,074	299708	182	377	\$0.007	\$11.4	\$5.5
>300 AU “Three-tier”	\$2,141	335456	206	425	\$0.006	\$10.4	\$5.0
>300 AU	\$2,316	335456	206	425	\$0.007	\$11.2	\$5.5

Source: USEPA. See *Economic Analysis*. Option/Scenario definitions provided in Table 10-2. ND=Not Determined.

^{1/} Costs are pre-tax.

I. Cost-Benefit Analysis

EPA estimated and compared the costs and benefits attributed to the proposed regulations. The cost and benefit categories that the Agency was able to quantify and monetize for the proposed regulations are shown in Table 10-16.

Total social costs of the proposed regulations range from \$847 million to \$949 million annually, depending on the co-proposed approach (Table 10-16). These costs include compliance costs to industry, costs to recipients of CAFO manure, and administrative costs to States and Federal governments.

Under the two-tier structure, EPA projects that total compliance cost to industry is \$831 million per year (pre-tax)/\$572 million (post-tax). By comparison, under the three-tier structure, EPA estimates that the cost to industry is \$930 million per year (pre-tax)/\$658 million (post-tax). Costs to industry include annualized capital costs, operating and maintenance costs, start-up and recurring costs, and also recordkeeping costs. Estimated costs cover four broad categories: nutrient management planning, facility upgrades, land application, and technologies for balancing on-farm nutrients. In addition, under the two-tier structure, EPA estimates that the cost to off-site recipients of CAFO manure is \$10 million per year. The administrative cost to State and Federal governments to implement the permit program is \$6 million per year. Under the three-tier structure, the annual cost to off-site recipients of manure is \$11 million and State and Federal administrative costs are \$8 million per year.

EPA estimates that the monetized benefits of the proposed regulations range from \$146 million to \$182 million annually, depending on the co-proposed approach (Table 10-16). Annual benefits are estimated to range from \$146 million to \$165 million under the two-tier structure; under the three-tier structure, estimated benefits range from \$163 million to \$182 million annually. EPA was only able to monetize (i.e., place a dollar value on) a small subset of the range of potential benefits that may accrue under the proposed regulations. Data and methodological limitations restricted the number of benefits categories that EPA was able to reasonably quantify and monetize. The proposed regulations benefits are primarily in the areas of reduced health risks and improved water quality, as shown in Table 10-16. In addition to these monetized benefits, EPA expects that additional benefits will accrue under the regulations, including reduced drinking water treatment costs, reduced odor and air emissions, improved water quality in estuaries, and avoided loss in property value near CAFOs, among other benefits. These benefits are described in more detail in the *Benefits Analysis* and other supporting documentation provided in the record.

Table 10-16. Total Annual Social Costs and Monetized Benefits, \$1999

Total Social Costs	“Two-Tier” Structure (500 AU threshold)	“Three-Tier” Structure (Scenario 3)
Industry Compliance Costs (pre-tax):	\$830.7 million	\$930.4 million
NPDES Permitting Costs:	\$6.2 million	\$7.7 million

Offsite Recipients of CAFO Manure:	\$9.6 million	\$11.3 million
<i>Total Social Costs</i>	<i>\$846.5 million</i>	<i>\$949.4 million</i>
Monetized Benefits		
Improved surface water quality	\$108.5 million	\$127.1 million
Reduced shellfish bed closures	\$0.2 - 2.4 million	\$0.2 - 2.7 million
Reduced fish kills	\$0.2 - 0.4 million	\$0.2 - 0.4 million
Improved water quality in private wells	\$36.6 - 53.9 million	\$35.4 - 52.1 million
<i>Total Monetized Benefits</i>	<i>\$145.5 - 165.1 million</i>	<i>\$163.0 - 182.3 million</i>

J. Initial Regulatory Flexibility Analysis

Pursuant to Section 603 of the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), the Agency prepared an Initial Regulatory Flexibility Analysis (IRFA) to assess the impacts on small livestock and poultry feeding operations. EPA’s IRFA and other supplemental economic analyses, as required under Section 607 of the RFA, are provided in Section 9 of the *Economic Analysis*. This section summarizes the estimated number of small entities to which the rule will apply and quantitatively describes the effects of the proposed regulations. Other information on EPA’s approach for estimating the number of small businesses in these sectors is provided in the *Final Report of the Small Business Advocacy Review Panel on EPA’s Planned Proposed Rule on National Pollutant Discharge Elimination System (NPDES) and Effluent Limitations Guideline (ELG) Regulations for Concentrated Animal Feeding Operations* (referred to as the “Panel Report”). The Panel Report is available in the rulemaking record, as well as online at <http://www.epa.gov/sbrefa>. A summary of the Small Business Advocacy Review (SBAR) Panel proceedings and recommendations is provided in Section XII.G of this preamble. Section XIII.B of this preamble summarizes other requirements to comply with the RFA.

1. Definition of Small Business

The Small Business Administration (SBA) defines a “small business” in the livestock and poultry sectors in terms of average annual receipts (or gross revenue). SBA size standards for these industries define a “small business” as one with average annual revenues over a 3-year period of less than \$0.5 million annually for dairy, hog, broiler, and turkey operations; \$1.5 million for beef feedlots; and \$9.0 million for egg operations. In today’s rule, EPA is proposing to define a “small” egg laying operation for purposes of its regulatory flexibility assessments as an operation that generates less than \$1.5 million in annual revenue. Because this definition of small business is not the definition established under the Regulatory Flexibility Act (RFA), EPA is specifically seeking comment on the use of this alternative

definition as part of today's notice of the proposed rulemaking (see Section XIII.B and Section XIV). EPA also has consulted with the SBA Chief Counsel for Advocacy on the use of this alternative definition. EPA believes this definition better reflects the agricultural community's sense of what constitutes a small business and more closely aligns with the small business definitions codified by SBA for other animal operations. A summary of EPA's rationale and supporting analyses pertaining to this alternative definition is provided in the record and in the *Economic Analysis*.

2. Number of Small Businesses Affected under the Proposed Regulations

Table 10-17 shows EPA's estimates of the number of small businesses in the livestock and poultry sectors and the number of small businesses that are expected to be affected by the proposed regulations. The approach used to derive these estimates is described in more detail in Section 9 of the *Economic Analysis* and also in Sections 4 and 5 of the Panel Report. EPA presented this and other alternative approaches during the SBAR Panel proceedings, as discussed in Section XII.G.2.a of this document. EPA is requesting public comment on this approach.

EPA uses three steps to determine the number of small businesses that may be affected by the proposed regulations. First, EPA identifies small businesses in these sectors by equating SBA's annual revenue definition with the number of animals at an operation. Second, EPA estimates the total number of small businesses in these sectors using farm size distribution data from USDA. Third, based on the regulatory thresholds being proposed, EPA estimates the number of small businesses that would be subject to the proposed requirements. These steps are summarized below.

In the absence of farm or firm level revenue data, EPA identifies small businesses in these sectors by equating SBA's annual revenue definitions of "small business" to the number of animals at these operations (step 1). This step produces a threshold based on the number of animals that EPA uses to define small livestock and poultry operations and reflects the average farm inventory (number of animals) that would be expected at an operation with annual revenues that define a small business. This initial conversion is necessary because USDA collects data by farm size, not by business revenue. With the exception of egg laying operations, EPA uses SBA's small business definition to equate the revenue threshold with the number of animals raised on-site at an equivalent small business in each sector. For egg laying operations, EPA uses its alternative revenue definition of small business.

EPA estimates the number of animals at an operation to match SBA's definitions using SBA's annual revenue size standard (expressed as annual revenue per entity) and USDA-reported farm revenue data that are scaled on a per-animal basis (expressed as annual revenue per inventory animal for an average facility). Financial data used for this calculation are from USDA's 1997 ARMS database. This approach and the data used for this calculation are outlined in Section 9 of the *Economic Analysis*. The resultant size threshold represents an average animal inventory for a small business. For the purpose of conducting its IRFA for this rulemaking, EPA is evaluating "small business" for these sectors as an operation that houses or confines less than: 1,400 fed beef cattle; 200 mature dairy cattle; 1,400 market hogs; 25,000 turkeys; 61,000 layers; or 260,000 broilers (Table 10-17).

EPA then estimates the total number of small businesses in these sectors using facility size distribution data from USDA (step 2). Using the threshold sizes identified for small businesses, identified above, EPA matches these thresholds with the number of operations associated with those size thresholds to estimate the total number of small animal confinement operations in these sectors. Finally, based on the regulatory thresholds being proposed—e.g., operations with more than 500 AU are CAFOs—EPA estimates the number of small businesses that will be subject to the proposed requirements (step 3). The 1997 Census constitutes the primary data source that EPA uses to match the small business thresholds (e.g., a small dairy operation has less than 200 milk cows) to the number of facilities that match that size group (e.g., the number of dairies with less than 200 cows, as reported by USDA). EPA also used other supplemental data, including other published USDA data and information from industry and the state extension agencies.

Table 10-17. Number of Small CAFOs That May Be Affected by the Proposed Regulations

Sector	Total Annual (\$million) Revenue ^{1/} (a)	Revenue per Head ^{2/} (b)	No. of Animals (Avg. U.S.) (c=a/b)	Estimated Number of Small AFOs	Two-Tier “Small” CAFOs	Three-Tier “Small” CAFOs
Cattle ^{3/}	\$1.5	\$1,060	1,400	106,450	2,280	2,600
Dairy	\$0.5	\$2,573	200	109,740	50	50
Hogs	\$0.5	\$363	1,400	107,880	300	300
Broilers	\$0.5	\$2	260,000	34,530	9,470	13,410
Egg Layers	\$9.0	\$25	365,000	ND	ND	ND
	\$1.5		61,000	73,710	200	590
Turkeys	\$0.5	\$20	25,000	12,320	0	500
All AFOs ^{4/}	NA	NA	NA	355,650	10,550	14,630

NA=Not Applicable. ND = Not Determined. “AFOs” have confined animals on-site. “CAFOs” are assumed to have more than 500 AU.

^{1/} SBA Size Standards by SIC industry (13 CFR Part 121). EPA assumes an alternative definition of \$1.5 million in annual revenues for egg layers.

^{2/} Average revenue per head across all operations for each sector derived from data obtained from USDA’s 1997 ARMS data.

^{3/} Includes fed cattle, veal and heifers.

^{4/} Total adjusts for operations with mixed animal types and includes designated CAFOs (expressed over a 10-year period). See Section VI.1 of this document for estimates of the total number of AFOs (including operations that are not defined as small businesses by SBA).

EPA estimates that there were approximately 376,000 animal confinement facilities in 1997 (Table 6-1). Most of these (95 percent) are small businesses, as defined by this approach (Table 10-17). However, not all of these operations will be affected by the proposed regulations.

For this analysis, EPA has identified the number of CAFOs that are also small businesses that would be subject to today's proposal. Under the two-tier structure, EPA estimates that 10,550 operations that will be subject to the proposed requirements that are small businesses. Under the three-tier structure, an estimated 14,630 affected operations are small businesses. See Table 10-17. The difference in the number of affected small businesses is among poultry producers, particularly broiler operations.

Under the two-tier structure, EPA estimates that there are 10,050 operations with more than 500 AU that may be defined as CAFOs that also meet the "small business" definition. Under the three-tier structure, there are 14,530 operations with more than 300 AU that may be defined as CAFOs that are small businesses that meet the proposed risk-based conditions (described in Section VII). These totals adjust for the number of operations with more than a single animal type. Under both co-proposed alternatives, most operations are in the broiler and cattle sectors. By broad facility size group, an estimated 4,060 operations have more than 1,000 AU, most of which are broiler operations (about 77 percent) and cattle operations (18 percent), including fed cattle, veal, and heifer operations. An estimated 6,490 operations have between 500 and 1,000 AU. The number of operations that would be regulated with between 300 and 1,000 AU is estimated at 10,570 operations (accounting for mixed operations).

Due to continued consolidation and facility closure since 1997, EPA's estimates may overstate the actual number of small businesses in these sectors. In addition, ongoing trends are causing some existing small and medium size operations to expand their inventories to achieve scale economies. Some of the CAFOs considered here as small businesses may no longer be counted as small businesses because they now have higher revenues. Furthermore, some CAFOs may be owned by a larger, vertically integrated firm, and may not be a small business. EPA expects that there are few such operations, but does not have data or information to reliably estimate the number of CAFOs that meet this description.

Under the two-tier structure, EPA estimates also include an additional 500 operations with fewer than 500 AU that may be designated as CAFOs under the proposed regulations over a 10-year period. See Section VI. Of these, 330 operations meet the small business definition: 50 dairies, 200 hog, 40 beef, 20 broiler, and 20 egg laying operations. Under the three-tier structure, EPA estimates that 100 operations with fewer than 300 AU may be designated over ten years, including 50 dairies and 50 hog operations, all of which are small businesses. As these facilities are designated, EPA did not adjust this total to reflect possible mixed animal operations. Each of these operations are small businesses.

3. Estimated Economic Impacts to Small CAFOs under the Proposed Regulations

EPA conducted a preliminary assessment of the potential impacts to small CAFO businesses based on the results of a costs-to-sales test. This screen test indicated the need for additional analysis to characterize the nature and extent of impacts on small entities. The results of this screening test indicate that about 80 percent (about 9,600) of the estimated number of small businesses directly subject to the

rule as CAFOs may incur costs in excess of three percent of sales (evaluated for all operations with more than 500 AU). Compared to the total number of all small animal confinement facilities estimated by EPA (356,000 facilities), operations that are estimated to incur costs in excess of three percent of sales comprise less than two percent of all small businesses in these sectors. The results of this analysis are provided in Section 9 of the *Economic Analysis*.

Based on the results of this initial assessment, EPA projected that it would likely not certify that the proposal, if promulgated, would not impose a significant economic impact on a substantial number of entities. Therefore, EPA convened a Small Business Advocacy Review Panel and prepared an Initial Regulatory Flexibility Analysis (IRFA) pursuant to Sections 609(b) and 603 of the RFA, respectively. Section XII.G provides more information on EPA's small business outreach and the Panel activities during the development of this rulemaking.

The results of EPA's assessment of the financial impacts of the proposed rule on small entities are as follows. To further examine small businesses effects, EPA used the same approach as that used to evaluate the impact to CAFOs under the proposed regulations described in Section X.D.1. Economic achievability is determined by applying the proposed criteria described in Section X.F.1. These criteria include a sales test and also analysis of post-compliance cash flow and debt-to-asset ratio for an average model CAFO.

Accordingly, if an average model facility is determined to incur economic impacts under regulation that are regarded as "Affordable" or "Moderate," then the proposed regulations are considered economically achievable. ("Moderate" impacts are not expected to result in closure and are considered to be economically achievable by EPA.) If an average operation is determined to incur "Stress," then the proposed regulations are not considered to be economically achievable. "Affordable" and "Moderate" impacts are associated with positive post-compliance cash flow over a 10-year period and a debt-to-asset ratio not exceeding 40 percent, in conjunction with a sales test result that shows that compliance costs are less than 5 percent of sales ("Affordable") or between 5 and 10 percent ("Moderate"). "Stress" impacts are associated with negative cash flow or if the post-compliance debt-to-asset ratio exceeds 40 percent, or sales test results that show costs equal to or exceeding 10 percent of sales. More detail on this classification scheme is provided in Section X.F.1.

EPA is proposing that the proposed regulations are economically achievable by small businesses in the livestock and poultry sectors. The results of this analysis are presented in Tables 10-18 and 10-19. As defined for this analysis, EPA's analysis indicates that the proposed requirements are economically achievable to all affected small businesses in the beef, veal, heifer, dairy, hog, and egg laying sectors ("Affordable" and also "Moderate"). Moderate impacts may be incurred by small businesses in some sectors, but these impacts are not associated with operational change at the CAFO. Under the two-tier structure, EPA expects that there are no small businesses in the turkey sector, as defined for this analysis. Under the three-tier structure, EPA expects that there are an estimated 500 small businesses in the turkey sector (operations with 16,500 to 25,000 birds) (Table 10-17).

EPA's IRFA analysis indicates that the proposed requirements will not result in financial stress to any affected small businesses in the veal, heifer (two-tier only), hog, dairy, egg laying, and turkey sectors. In the beef, heifer (three-tier only), and broiler sectors, however, EPA's analysis indicates that proposed regulations could result in financial stress to some small businesses, making these businesses vulnerable to closure. Overall, these operations comprise about 2 percent of all affected small CAFO businesses. For the two-tier structure, EPA estimates that 10 small beef operations and 150 small broiler operations will experience financial stress. For the three-tier structure, EPA estimates that 40 small beef and heifer operations and 280 small broiler operations will experience financial stress. Small broiler facilities with stress impacts are larger operations with more than 1,000 AU under both tier structures. Small cattle and heifer operations with stress impacts are those that have a ground water link to surface water. This analysis is conducted assuming that no costs are passed through between the CAFO and processor segments of these industries. Based on the results of this analysis, EPA is proposing that the proposed regulations are economically achievable to small businesses in these sectors.

EPA believes that the small business impacts presented are overstated for reasons summarized below. As noted in the Panel Report, EPA believes that the number of small broiler operations is overestimated. In the absence of business level revenue data, EPA estimated the number of "small businesses" using the approach described in Sections X.J.1 and X.J.2. Using this approach, virtually all (>99.9 percent) broiler operations are considered "small" businesses. This categorization may not accurately portray actual small operations in this sector since it classifies a 10-house broiler operation with 260,000 birds as a small business. Information from industry sources suggests that a two-house broiler operation with roughly 50,000 birds is more appropriately characterized as a small business in this sector. This information is available in the rulemaking record. Therefore, it is likely that the number of small broiler operations may reflect a number of medium and large size broiler operations being considered as small entities. (During the development of the rulemaking, EPA did consult with SBA on the use of an alternative definition for small businesses in all affected sectors based on animal inventory at an operation. Following discussions with SBA, EPA decided not to use this alternative definition. This information is provided in the record.)

EPA believes that the use of a costs-to-sales comparison is a crude measure of impacts on small business in sectors where production contracting is commonly used, such as in the broiler sector (but also in the turkey, egg, and hog sectors, though to a lesser extent). As documented in the *Economic Analysis*, lower reported operating revenues in the broiler sector reflect the predominance of contract growers in this sector. Contract growers receive a pre-negotiated contract price that is lower than the USDA-reported producer price, thus contributing to lower gross revenues at these operations. Lower producer prices among contract growers is often offset by lower overall production costs at these operations since the affiliated processor firm pays for a substantial portion of the grower's annual variable cash expenses. Inputs supplied by the integrator may include feeder pigs or chicks, feed, veterinary services and medicines, technical support, and transportation of animals. These variable cash costs comprise a large component of annual operating costs, averaging more than 70 percent of total variable and fixed costs at livestock and poultry operations. The contract grower also faces reduced risk because the integrator guarantees the grower a fixed output price. Because production costs at a

contract grower operation are lower than at an independently owned operation, a profit test (costs-to-profit comparison) is a more accurate measure of impacts at grower operations. However, financial data are not available that differentiate between contract grower and independent operations.

EPA’s analysis also does not consider a range of potential cost offsets available to most operations. One source of potential cost offset is cost share and technical assistance available to operators for on-site improvements that are available from various state and federal programs, such as the Environmental Quality Incentives Program (EQIP) administered by USDA. These programs specifically target smaller farming operations. Another potential source of cost offset is manure sales, particularly of relatively higher value dry poultry litter. More information on how these potential sources of cost offset would reduce the economic impacts to small operations is described in Section X.F.1 in this document and also in the *Economic Analysis*. EPA’s analysis also does not account for eventual cost passthrough of estimated compliance costs through the marketing chain under longer run market adjustment. Finally, this analysis does not take into account certain non-economic factors that may influence a CAFO’s decision to weather the boom and bust cycles that are commonplace in agricultural markets. These other industry-specific factors are discussed in more detail throughout the *Economic Analysis*.

EPA expects that the proposed regulations will benefit the smallest businesses in these sectors since it may create a comparative advantage for smaller operations (less than 500 AU), especially those operations which are not subject to the regulations. Except for the few AFOs which are designated as CAFOs, these operations will not incur costs associated with the proposed requirements but could benefit from eventual higher producer prices as these markets adjust to higher production costs in the longer term.

As detailed in Sections XII.G and XIII.B of this document, EPA convened a Small Business Advocacy Review Panel during the development of this rule. As described in the Panel Report, EPA considered certain regulatory alternatives to provide relief for small businesses. Some of these alternatives are discussed in other sections of this document, including Section VII and Section VIII. These alternative options are summarized in the following section and are described in more detail in Section 9 of the *Economic Analysis*.

Table 10-18. Results of EPA’s Small Business Analysis Under the BAT Option/Scenario 4a

Sector	Number of Small CAFOs	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		Zero Cost Passthrough					
		(Number of Operations)			(% Affected Operations)		
Fed Cattle	1,390	1,130	250	10	81%	18%	1%
Veal	90	90	0	0	100%	0%	0%

Heifer	800	680	120	0	85%	15%	0%
Dairy	50	40	10	0	80%	20%	0%
Hogs	300	300	0	0	100%	0%	0%
Broilers	9,470	1,860	7,460	150	20%	79%	2%
Layers	200	200	0	0	100%	0%	0%
Turkeys	0	0	0	0	NA	NA	NA
TOTAL	10,550	4,300	7,840	160	41%	74%	2%

Source: USEPA. Impact estimates shown include impacts to designated operations. Option/Scenario definitions provided in Table 10-2. Category definitions (“Affordable,” “Moderate” and “Stress”) are provided in Section X.F.1. Numbers may not add due to rounding. NA = Not Applicable.

^{1/}“Total” does not adjust for operations with mixed animal types, for comparison purposes, to avoid understating costs at operations with more than one animal type that may incur costs to comply with the proposed requirements for each type of animal that is raised on-site. The number of CAFOs shown includes expected defined CAFOs only and excludes designated facilities.

Table 10-19. Results of EPA’s Small Business Analysis Under the BAT Option/Scenario 3

Sector	Number of Small CAFOs	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		Zero Cost Passthrough					
		(Number of Operations)			(% Affected Operations)		
Fed Cattle	1,490	1,100	380	10	74%	26%	1%
Veal	140	140	0	0	100%	0%	0%
Heifer	980	800	150	30	82%	15%	3%
Dairy	50	40	10	0	80%	20%	0%
Hogs	300	300	0	0	100%	0%	0%
Broilers	13,410	1,910	11,220	280	14%	84%	2%
Layers	590	590	0	0	100%	0%	0%
Turkeys	500	460	40	0	92%	8%	0%
TOTAL	14,630	5,340	11,800	320	37%	81%	2%

Source: USEPA. Impact estimates shown include impacts to designated operations. Option/Scenario definitions provided in Table 10-2. Category definitions (“Affordable,” “Moderate” and “Stress”) are provided in Section X.F.1. Numbers may not add due to rounding. NA = Not Applicable.

^{1/}“Total” does not adjust for operations with mixed animal types, for comparison purposes, to avoid understating costs at operations with more than one animal type that may incur costs to comply with the proposed requirements for each type of animal that is raised on-site. The number of CAFOs shown includes expected defined CAFOs only and excludes designated facilities.

4. Regulatory Relief to Small Livestock and Poultry Businesses

EPA proposes to focus the regulatory revisions in this proposal on the largest operations, which present the greatest risk of causing environmental harm, and in so doing, has minimized the effects of the proposed regulations on small livestock and poultry operations. First, EPA is proposing to establish a two-tier structure with a 500 AU threshold. Unlike the current regulations, under which some operations with 300 to 500 AU are defined as CAFOs, operations of this size under the revised regulations would be CAFOs only by designation. Second, EPA is proposing to eliminate the “mixed” animal calculation for operations with more than a single animal type for determining which AFOs are CAFOs. Third, EPA is proposing to raise the size standard for defining egg laying operations as CAFOs.

EPA estimates that under the co-proposed alternatives, between 64 percent (two-tier) and 72 percent (three-tier) of all CAFO manure would be covered by the regulation. (See Section IV.A of this preamble.) Under the two-tier structure, the inclusion of all operations with more than 300 AU instead of operations with more than 500 AU, the CAFO definition would result in 13,800 additional operations being regulated, along with an additional 8 percent of all manure. An estimated 80 percent of these additional 13,800 CAFOs are small businesses (about 10,870 CAFOs). EPA estimates that by not extending the regulatory definition to operations with between 300 and 500 AU, these 10,870 small businesses will not be defined as CAFOs and will therefore not be subject to the proposed regulations. The additional costs of extending the regulations to these small CAFO businesses is estimated at almost \$150 million across all sectors. The difference in costs between the two-tier and the three-tier structures may be approximated by comparing the estimated costs for these regulatory options, which are shown in Table 10-5. Also, under the two-tier structure, EPA is proposing to raise the size standard for defining egg laying operations as CAFOs. This alternative would remove from the CAFO definition egg operations with between 30,000 and 50,000 laying hens (or 75,000 hens) that under the current rules are defined as CAFOs, if they utilize a liquid manure management system.

In addition, under both co-proposed alternatives, EPA is proposing to exclude mixed operations with more than a single animal type. The Agency determined that the inclusion of these operations would disproportionately burden small businesses while resulting in little additional environmental benefit. Since most mixed operations tend to be smaller in size, this exclusion represents important accommodations for small businesses. If certain of these smaller operations are determined to be discharging to waters of the U.S., States can later designate them as CAFOs and subject them to the regulations.